5-6115-590-12

TM 5-6115-590-12

TECHNICAL MANUAL

OPERATOR AND ORGANIZATIONAL
MAINTENANANCE MANUAL

POWER PLANT, UTILITY, (MUST) GAS TURBINE ENGINE DRIVEN

(AMERTECH CORPORATION MODEL NO. APP-1)

NSN 6115-00-937-0929 (NON-WINTERIZED)

AND

NSN 6115-00-134-0825 (WINTERIZED)

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WASHINGTON, D.C., 5 June 1989

Operator's, and Organizational Maintenance Manual

POWER PLANT, UTILITY, (MUST) GAS TURBINE ENGINE DRIVEN
(AIRESEARCH COMPANY MODEL NO. PPU85-5),
(LIBBY WELDING COMPANY MODEL NO. LPU-71),
(AMERTECH CORPORATION MODEL NO. APP-1),
AND
(HOLLINGSWORTH COMPANY MODEL NO. JHTWX10/96)
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Operator's and Organizational Maintenance Manual

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(AIRESEARCH COMPANY MODEL NO. PPU85-5),
(LIBBY WELDING COMPANY MODEL NO. LPU-71),
(AMERTECH CORPORATION MODEL NO. APP-1),
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Operator's and Organizational Maintenance Manual

POWER PLANT, UTILITY, (MUST) GAS

TURBINE ENGINE DRIVEN

(AIRESEARCH COMPANY MODEL NO. PPU85-5),

(LIBBY WELDING COMPANY MODEL NO. LPU-71),

(AMERTECH CORPORATION MODEL NO. APP-1),

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POWER PLANT, UTILITY, (MUST) GAS

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Operator and Organizational Maintenance Manual

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TURBINE ENGINE DRIVEN
(AMERTECH CORPORATION MODEL NO. APP-1)
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Operator and Organizational Maintenance Manual

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WARNING

Take particular heed to specific warnings and cautions through this manual.

HIGH VOLTAGE

is used in the operation of this equipment.

DEATH

or severe burns may result if personnel fail to observe safety precautions. Do not operate this equipment until the ground terminal has been connected to a suitable ground.
Disconnect the battery negative cable before removing or installing components in any electrical panel or system.
Before servicing or repairing any part of the power plant, be sure that it is not connected to another power plant that is operating. Do not service the power plant while it is connected for standby operation. Ground the ignitor plug or ignition unit before removal by grounding the high tension lead contact spring to the ignitor immediately upon removal of the lead.

HIGH SPEED ROTATION AND HIGH FREQUENCY NOISE

are present during operation of this equipment. All personnel within a perimeter of 20 feet back from the operator's position and five feet from the sides and rear of the power plant are required to wear ear protectors.

DEATH

or severe injury may result if personnel fail to observe safety precations.
During unit starting, operation, or testing stand clear of the sides of the engine. Extreme care must be exercised to prevent debris or foreign material from entering the air inlet. Turbine or compressor failure induced by foreign material entering the unit may be sufficiently violent to cause severe damage to internal components with possible danger to personnel in the immediate area.

DANGEROUS GASES AND EXTREME HEAT

are generated as a result of operating this equipment.

DEATH

or severe injury may occur if personnel fail to observe safety precautions. Stay clear of exhaust openings during operation of the power plant. Allow exhaust and heat exchanger components to cool before attempting maintenance on or near them. Extreme exhaust heat is generated by the gas turbine engine.
Do not operate power plant in enclosed area unless adequate ventilation of exhaust gases is provided. Exhaust discharge contains noxious and deadly fumes.

DEATH

Do not smoke or use open flame in vicinity when servicing batteries.
Batteries generate explosive gas during charging. Some solvents used for cleaning of components during repair are toxic and shall be used only in well ventilated areas. Observe specific warnings in this manual.

LIQUIDS AND GASES UNDER PRESSURE

are generated as a result of operation of this equipment.

INJURY

May result if personnel fail to observe safety precautions. Keep hands and other exposed areas of the body away from any malfunctions of plumbing in refrigeration system, hot water system, bleed air system, and lubrication system. Wear protective gloves and other clothing when handling heated components or servicing refrigeration as directed by specific warnings in this manual.

WARNING

Operators working in the area of equipment generating high frequency noises, especially if such equipment is operating in a confined area, will be required to wear ear plugs, supplemented by ear protectors. See your safety or medical officer for examination requirmenets and National Stock Number (NSN) for ear plugs and protectors. All personnel within a perimeter of 200 feet from the operator's position and five feet from the sides and rear of the power plant are required to wear ear protectors.

WARNING

Either lead-acid or Nickel-Cadmium batteries may be used in this equipment. Injury or death may result if the Potassium Hydroxide electrolyte is added to the Lead-acid battery. Do not add Sulphuric Acid electrolyte to Potassium Hydroxide Battery.

WARNING

Battery acid is very corrosive. Wear rubber gloves, apron and face shield when working on batteries. If battery electrolyte is spilled on clothing, or other material wash immediately with clean water. If spilled on personnel, start flushing the affected area immediately with large amounts of clean water. Continue flushing until medical assistance arrives.

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Operator's and Organizational Maintenance Manual

POWER PLANT, UTILITY,(MUST) GAS TURBINE ENGINE DRIVEN (AIRESEARCH COMPANY MODEL NO. PPU85-5), (LIBBY WELDING COMPANY MODEL NO. LPU-71), (AMERTECH CORPORATION MODEL NO. APP-1), AND (HOLLINGSWORTH COMPANY MODEL NO. JHTWX10/96) NSN 6115-00-937-0929 (NON-WINTERIZED) AND NSN 6115-00-134-0825 (WINTERIZED)

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FO-3	Engine and Skid Assembly Wiring Diagram (Sheet 1 of 2)	Fold Out, Back of Book
FO-3	Engine and Skid Assembly Wiring Diagram (Sheet 2 of 2)	Fold Out, Back of Book
FO-4	Conditioned Air System Wiring Diagram (Sheet 1 of 2)	Fold Out, Back of Book
FO-4	Conditioned Air System Wiring Diagram (Sheet 2 of 2)	Fold Out, Back of Book

CHAPTER 1
INTRODUCTION

Section I. General

1-1. Scope

This manual is for your use in operating and maintaining the Power Plant, Utility, (Medical Unit, Self- Contained, Transportable), Gas Turbine Engine Driven, AiResearch Model PPU85-5, Libby Welding Model LPU-71, Amertech Model APP-1, and Hollingsworth Model JHTWX10/96.

1-2. Maintenance Forms and Records

a. The maintenance forms and records required to maintain this equipment includes DA Form 2402 (Exchange Tag), DA Form 2404 (Equipment Inspection and Maintenance Work Sheet), and DD Form 314 (Preventive Maintenance Schedule and Record).

b. Any additional forms that are required are listed and explained in TM 38-750 (Army Maintenance Management System).

1-3. Destruction of Army Material to Prevent Enemy Use

a. Improper Operation. Pour water, sand or dirt into oil tank and run engine until failure occurs. Cut electrical cables, oil and fuel lines and hoses.

b. Fire. Use fire to destroy equipment when quantities of fuel and flammable materials are at hand. Burn assemblies and components on a priority basis if possible. Proper concentration of equipment to be burned will produce a hotter more destructive fire. Fires should be lit after mechanical destruction has been accomplished.

c. Mechanical Destruction. Use sledge hammers, crowbars, picks, axes or any other heavy tools to destroy all vital elements such as fuel and oil tanks, filters, pumps, starter, generators, battery, upper and lower electrical racks, fuel atomizer, combustion assembly, accessory gearcase, compressor and turbine assembly, control panels, condensers, evaporators, and any other major assembly or components.

d. Gunfire. Fire on the equipment with the heaviest weapons available, aiming at the major assemblies and controls.

WARNING

Point blank firing on equipment with weapons should not be attempted unless the safety of all personnel in the area is assured.

NOTE

For further instructions on destruction of equipment to prevent enemy use, refer to TM 750-244-3.

1-4. Administrative Storage

a. Preparation of the Power Plant for Limited Storage.

(1) *Inspection.* The power plant will be inspected for any unusual conditions such as damage, rusting, accumulation of water and pilferage. Inspection of the individual components and assemblies will be outlined on the "Preventive Maintenance Service Quarterly" in this manual.

(2) *Cleaning and Drying.* All contamination shall be removed from the power unit by an approved method. Approved methods of cleaning and drying are described in TM 38-230.

(3) *Painting.* Paint all surfaces where the paint has been removed or damaged. Refer to TM 43-0139 for detail cleaning and painting instructions.

(4) *Depreservation Guide.* Record depreservation instructions on DA Form 2258 (Preservation and Depreservation Guide for Vehicles and Equipment).

(5) *Lubrication System.* Lubricate the item in accordance with LO 5-6115-590-12, lubrication order. Make sure that the crankcase is filled to the proper level. Operate the engine long enough to bring it up to its operating temperature and insure complete lubrication of bearings, gears, etc. Leave the oil in the crankcase.

(6) *Sealing of Openings.* Openings that will permit the direct entry of water into the interior of the engine, electric motors, compressors, etc., shall be sealed with tape conforming to Specification PPT-T-60, Type IV.

(7) *Fuel Tank.* Drain the fuel tank after engine preservation.

(8) *Exterior Surfaces.* Coat exposed machined ferrous metal surfaces with Type P-6 preservative (CL) conforming to Specification MIL-C-11796 Class 3. If the preservative is not available, use Automotive and Artillery Grease (GAA) as specified in the lubrication order.

(9) *Batteries and Cables.* Disconnect cables and secure to battery support or carrier with tape conforming to Specification PPP-T-60, Type IV.

(10) *Marking.* Marking shall conform to MIL-STD-129.

b. Inspection and Maintenance of Equipment in Storage. When the item has been placed in limited

storage, all scheduled preventive maintenance services, including inspection, shall be suspended and preventive maintenance inspection shall be performed as specified herein. Perform quarterly preventive maintenance services when the item is initially placed in limited storage and every 30 days thereafter. Record all deficiencies and shortcomings together with corrective action taken on DA Form 2404. Required maintenance will be performed promptly to insure that the item is sound and ready for immediate use. At the time of the 30 day inspection and maintenance, operate the item long enough to bring it up to operating temperature and insure complete lubrication of all bearings, gears, etc. Operate the cold water pump for 30 seconds to prevent pump freeze up. After each operating period, represerve the item as outlined in paragraph 1-4 a.

c. *Administrative Storage.*

(1) *Storage Site.*

(a) Select the best available site for administrative storage. Separate stored equipment from equipment in use. Conspicuously mark the area "Administrative Storage."

(b) Covered space is preferred. When sufficient covered space for all items to be stored is not available, priority should be given to items which are most susceptible to deterioration from the elements. SB 38-1 should be used as a guide for establishing the items most susceptible to deterioration.

(c) Open sites should be improved hardstand, if available. Unimproved sites should be firm, well-drained, and kept free of excessive vegetation.

(2) *Storage Plan*

(a) Store equipment so as to provide maximum protection from the elements and to provide access for inspection, maintenance, and exercising. Anticipate removal or deployment problems and take suitable precautions. For example, strategically locate recovery vehicles, snowplows, slave units, and similar items likely to be needed on short notice.

(b) Take into account environmental conditions such as extreme heat or cold, high humidity, blowing sand, dust or loose debris, soft ground, mud, heavy snows, earthquakes or combinations thereof and take adequate precautions.

(3) *General Cleaning, Painting and Preservation.*

(a) *Cleaning.* Clean the equipment of dirt, grease, and other contaminates, but do not use vapor degreasing.

CAUTION

Do not direct water or steam, under pressure against air cleaners, air duct outlets, exhaust outlets, unsealed electrical systems, fire control instruments, or any exterior opening which will damage a component.

(b) *Painting.* Remove rust and damaged paint by scraping, wire brushing, sanding or buffing. Sand to a smooth finish and spot paint as necessary. See TM 43-0139.

(c) *Preservation.* After cleaning and drying, immediately coat unpainted metal surfaces with oil or grease as appropriate.

(d) *Weatherproofing.* Sunlight, heat, moisture (humidity), and dirt tend to accelerate deterioration. Install all covers authorized for the equipment. Close and secure all openings except those required for venting and draining. Seal openings to prevent the entry of rain, snow, or dust. Insert desiccant when a complete seal is required. Place equipment and provide adequate blocking to allow for draining of water.

NOTE

Secure waterproof covers so as to prevent collection of water and to allow circulation of air to minimize damage from condensation and excessive heat.

CAUTION

Place a piece of barrier material between desiccant bags and metal surfaces to prevent corrosion.

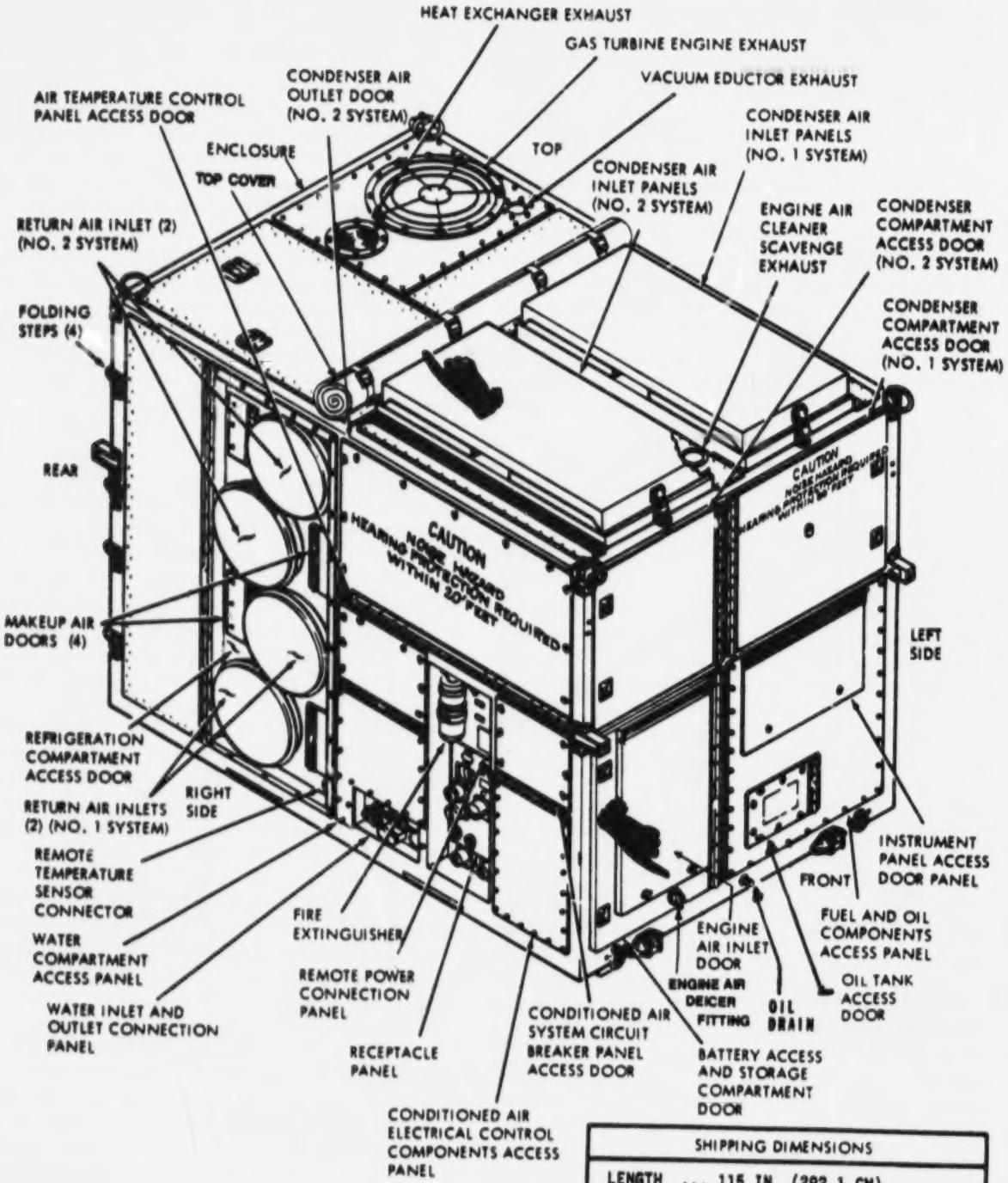
NOTE

Refer to TM 740-90-1 for additional information regarding administrative storage of this equipment.

Section II. Description and Data

1-5. Description

a. *General.* This power plant is a fully enclosed, skid mounted, self-contained, portable unit (fig. 1-1 and 1-2). The unit provides conditioned air (heating, cooling and ventilation), electrical power (400 Hz, 60 Hz and 24 volts DC emergency lighting power), hot and cold water, compressed air, and a vacuum system for support of the MUST (Medical Unit Self-Contained, Transportable) hospital elements. The power plant consists of a gas turbine engine power plant, electrical generating system, conditioned air system (including refrigeration), water system, compressed air system, vacuum system, enclosure, and accessory components for connection of the power plant to other elements of the MUST hospital. The power plant requires only an external source of fuel and water for self-contained operation. It will operate at ambient temperature from 140 degrees F to -25 degrees F (-65 degrees with a winterization unit installed). Lifting, tiedown, support and


HEAT EXCHANGER EXHAUST
GAS TURBINE ENGINE EXHAUST
VACUUM EDUCTOR EXHAUST
CONDENSER AIR OUTLET DOOR (NO. 2 SYSTEM)
AIR TEMPERATURE CONTROL PANEL ACCESS DOOR
ENCLOSURE
TOP COVER
TOP
CONDENSER AIR INLET PANELS (NO. 1 SYSTEM)
CONDENSER AIR INLET PANELS (NO. 2 SYSTEM)
ENGINE AIR CLEANER SCAVENGE EXHAUST
CONDENSER COMPARTMENT ACCESS DOOR (NO. 2 SYSTEM)
RETURN AIR INLET (2) (NO. 2 SYSTEM)
FOLDING STEPS (4)
CONDENSER COMPARTMENT ACCESS DOOR (NO. 1 SYSTEM)
REAR
CAUTION NOISE HAZARD HEARING PROTECTION REQUIRED WITHIN 20 FEET
MAKEUP AIR DOORS (4)
LEFT SIDE
REFRIGERATION COMPARTMENT ACCESS DOOR
RIGHT SIDE
RETURN AIR INLETS (2) (NO. 1 SYSTEM)
INSTRUMENT PANEL ACCESS DOOR PANEL
FRONT
REMOTE TEMPERATURE SENSOR CONNECTOR
FUEL AND OIL COMPONENTS ACCESS PANEL
FIRE EXTINGUISHER
ENGINE AIR INLET DOOR
WATER COMPARTMENT ACCESS PANEL
ENGINE AIR DEICER FITTING
OIL DRAIN
OIL TANK ACCESS DOOR
REMOTE POWER CONNECTION PANEL
WATER INLET AND OUTLET CONNECTION PANEL
CONDITIONED AIR SYSTEM CIRCUIT BREAKER PANEL ACCESS DOOR
RECEPTACLE PANEL
BATTERY ACCESS AND STORAGE COMPARTMENT DOOR
CONDITIONED AIR ELECTRICAL CONTROL COMPONENTS ACCESS PANEL

SHIPPING DIMENSIONS	
LENGTH	... 115 IN. (292.1 CM)
WIDTH	... 75 IN. (190.5 CM)
HEIGHT	... 92 IN. (233.68 CM)
WEIGHT	... 4,700 LB.(2133.8 KG) MAX
VOLUME	... 460 CU. IN. (7538.09 CU.CM.)

TS 6115-590-12/1-1

Figure 1-1. Power Plant, Right Front, Three-Quarter View With Shipping Dimensions. (TS 6115-590-12/1-1).

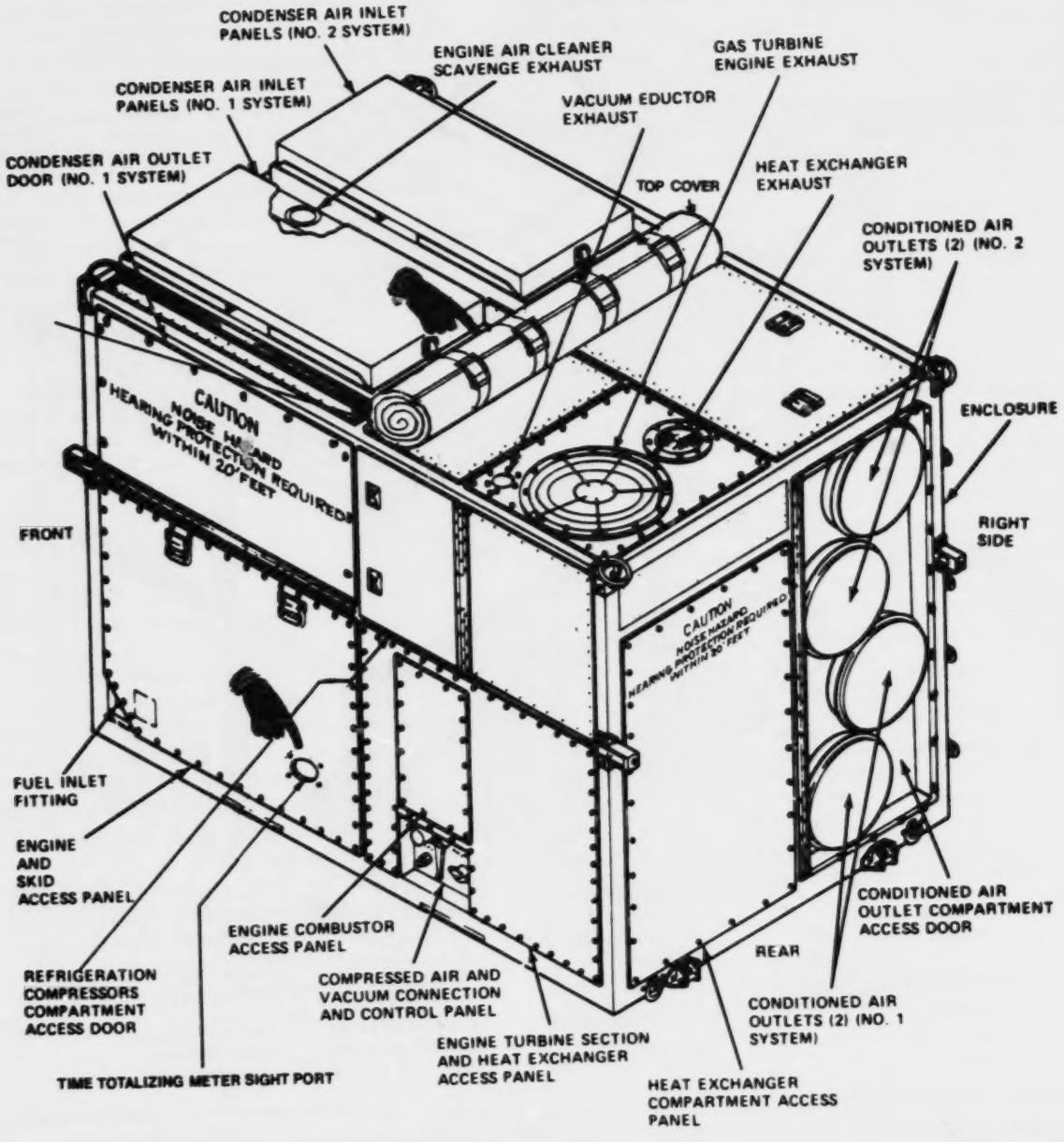

CONDENSER AIR INLET PANELS (NO. 2 SYSTEM)
ENGINE AIR CLEANER SCAVENGE EXHAUST
GAS TURBINE ENGINE EXHAUST
CONDENSER AIR INLET PANELS (NO. 1 SYSTEM)
VACUUM EDUCTOR EXHAUST
CONDENSER AIR OUTLET DOOR (NO. 1 SYSTEM)
TOP COVER
HEAT EXCHANGER EXHAUST
CONDITIONED AIR OUTLETS (2) (NO. 2 SYSTEM)
ENCLOSURE
RIGHT SIDE
FRONT
CAUTION NOISE HAZARD HEARING PROTECTION REQUIRED WITHIN 20 FEET
CAUTION NOISE HAZARD HEARING PROTECTION REQUIRED WITHIN 20 FEET
FUEL INLET FITTING
ENGINE AND SKID ACCESS PANEL
ENGINE COMBUSTOR ACCESS PANEL
CONDITIONED AIR OUTLET COMPARTMENT ACCESS DOOR
REAR
REFRIGERATION COMPRESSORS COMPARTMENT ACCESS DOOR
COMPRESSED AIR AND VACUUM CONNECTION AND CONTROL PANEL
CONDITIONED AIR OUTLETS (2) (NO. 1 SYSTEM)
ENGINE TURBINE SECTION AND HEAT EXCHANGER ACCESS PANEL
TIME TOTALIZING METER SIGHT PORT
HEAT EXCHANGER COMPARTMENT ACCESS PANEL
TS 6115-590-12/1-2

Figure 1-2. Power Plant, Left Unit, Left Rear, Three-Quarter View. (TS 6115-590-12/1-2)

connection provisions on the enclosure provide mobility of the unit by truck, railroad car, helicopter, airplane, mobilizing transporter wheels, and by skidding.

b. Gas turbine engine power plant (fig. 1-3). The gas turbine engine power plant is installed in the lower left front corner of the power unit and consists of a pneumatic and shaft power gas turbine engine, 60 Hz and 400 Hz generators, a fuel system, a lubrication system, various air ducts, plumbing installation, electrical wiring installation, and a skid base. Two electrical rack assemblies are installed on the power plant skid base and contain various regulating and control components for the power unit electrical system. The gas turbine engine power plant provides shaft power to drive the 60 Hz and 400 Hz generators. Compressed air from the engine compressor section is used for external pneumatic power requirements, for heated air in the conditioned air system, water compartment heating air, vacuum system eductor air, engine air cleaner ejector air and deicing the engine air inlet filter. The engine exhaust heat is utilized through a heat exchanger to heat water for the water system.

(1) Pneumatic and Shaft Power Gas Turbine Engine (fig. 1-3). The gas turbine engine is a self-contained power source and requires only a fuel supply and electrical starting power to maintain a constant output power and rpm (revolutions per minute). Engine power is developed through compression of ambient air by a two-stage centrifugal compressor; the compressed air, mixed with fuel and ignited, drives a radial inward-flow turbine wheel. The rotating shaft power of the turbine wheel drives the compressor, the accessories, and the output drive shafts. A portion of the compressed air developed by the compressor is available for external pneumatic power applications. An internal system of pneumatic and electro-mechanical controls provide automatic and coordinated control of engine starts, acceleration, and operation. A minimum of additional external controls are required to initiate the engine starting cycle, monitor engine operation, and to stop engine operation. The gas turbine engine consists of a compressor and turbine section, accessory drive section, fuel control system, bleed-air control system, engine electrical system, and engine lubrication system.

(a) Compressor and Turbine Section. The compressor and turbine section is the power nucleus of the engine. The two stage centrifugal compressor develops compressed air for fuel combustion and for external pneumatic power. The single stage turbine incorporates a single combustion chamber which mixes compressed air with the fuel spray from the fuel atomizer, ignites the fuel-air mixture and directs the products of combustion to the turbine wheel. The turbine wheel converts the power developed in the combustion chamber to shaft power which drives the compressor impellers and the accessory drive section.

(b) Accessory Drive Section. The accessory drive section is a reduction gear system which reduces the high rotational speeds developed by the turbine wheel to a usable rpm to drive the engine accessory gear box and a dual pad gear box for the 60 Hz and 400 Hz generators. In addition to mounting pads for the two generators, the accessory drive section provides mounting pads and drive gear connection for the following accessories: oil pump assembly; fuel control unit; centrifugal switch assembly; cooling air fan; starter motor; and tachometer-generator.

(c) Fuel System (fig. 1-4). The engine fuel system consists of components which function automatically to regulate fuel flow to the combustion chamber and maintain near constant governed speed and safe operating temperatures under varying conditions of starting, acceleration, and load application. Control components function by sensing engine speed, turbine exhaust gas temperature and compressor air pressure, and react by adjusting fuel flow to maintain these reference indications within established limits. The fuel system consists of the following components together with interconnecting lines and fittings: a one gallon fuel tank for fuel reserve during changeover from one external fuel supply to another; a fuel float tank incorporating a float switch which will initiate unit shutdown to prevent damage to the fuel control in the event the fuel supply is exhausted while the unit is running; a manual push valve for purging from the fuel float tank; an external fuel filter assembly; a fuel boost pump to assure a constant inlet pressure to the fuel control unit; a fuel filter assembly to filter fuel between the fuel boost pump and fuel control unit; a manual push valve for purging air from the fuel inlet system; a fuel control unit to regular fuel flow to the combustion chamber in response to engine rpm and load requirements; a fuel shutoff solenoid valve to provide electrically actuated on and off control of fuel flow between fuel control unit and fuel atomizer assembly; a fuel atomizer assembly to provide a controlled fuel spray pattern for proper fuel combustion; an acceleration and overtemperature control thermostat to prevent excessive exhaust gas temperature during engine acceleration.

(d) Bleed-Air Control System (fig. 1-4). The bleed-air control system automatically limits the amount of compressed air available for external applications, thus maintaining a safe engine operating temperature and preventing an overload

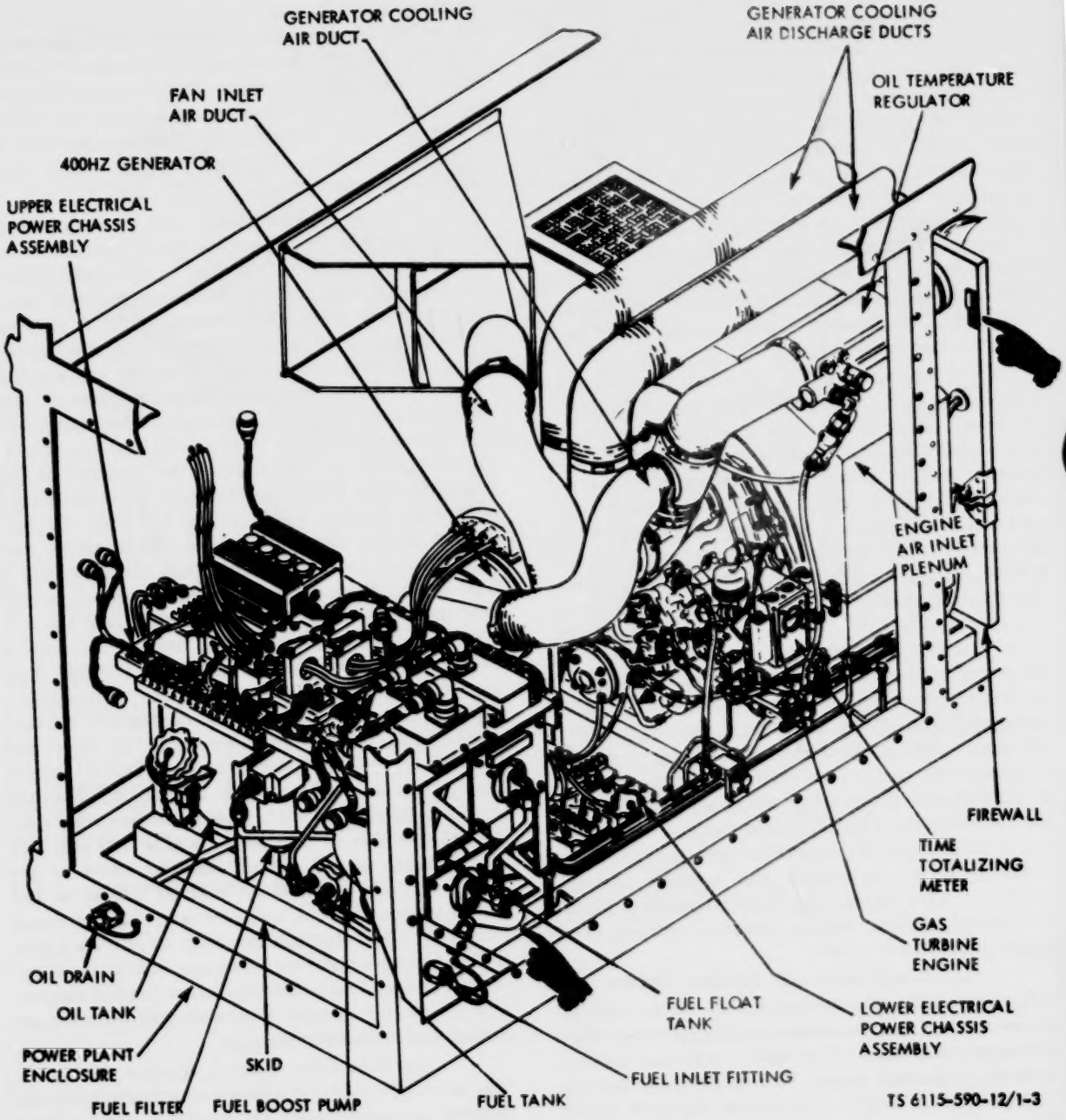


Figure 1-3. Gas Turbine Engine Power Plant. (TS 6115-590-12/1-3).

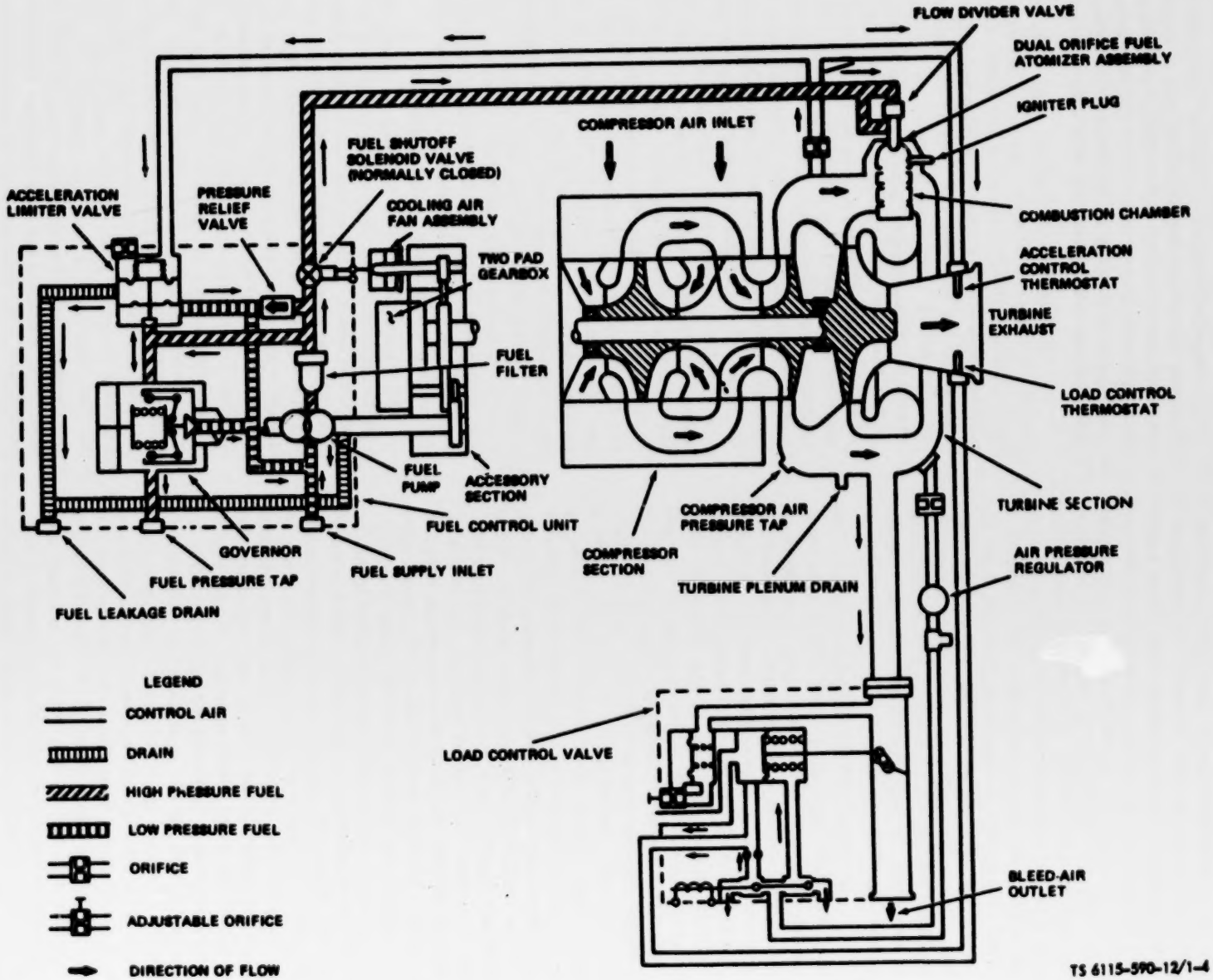


Figure 1-4. Engine Fuel and Bleed-Air Control System Schematic. (TS 6115-590-12/1-4).

condition due to excessive demands for shaft power and pneumatic power. Automatic limiting of bleed-air is accomplished by a pneumatic thermostat installed in the turbine exhaust that opens at a preset exhaust gas temperature and bleeds control air from the load control valve to modulate and reduce the flow of compressed air from the engine. The bleed-air control system consists of the following components together with interconnecting lines and fittings: load control valve; air pressure regulator; and load control thermostat. The utilization of bleed-air supplied at the bleed-air outlet from the engine for external compressed air requirements, heated air in the conditioned air system, water compartment heating air, and vacuum system ejector air is described in later paragraphs in the section concerning those systems.

(*e*) *Engine Electrical System* (*fig. 1-5*). The engine electrical system is a 24V DC system which provides automatic actuation in proper sequence, of the various circuits which control engine starting, ignition, fuel flow, acceleration, monitoring engine operation, and engine shutdown. The engine electrical system consists of the following components together with interconnecting wiring and connectors: starter motor, centrifugal switch, oil pressure sequencing switch, low oil pressure switch, ignition unit, igniter plug, fuel shutoff solenoid valve, load control valve solenoid, time totalizing meter, circuit breaker, oil temperature bulb, exhaust gas temperature thermocouple, tachometer-generator, and an engine air blockage alarm system. When energized, the starter motor rotates the engine gear train and compressor and turbine rotating parts. Rising oil pressure actuates the oil pressure sequencing switch to complete a circuit to open the fuel shutoff solenoid valve and energize the ignition unit and igniter plug. At approximately 35-percent of engine governed speed, the starter cutout switch in the centrifugal switch actuates to open the circuit to the starter motor. At approximately 95-percent of engine governed speed, the ready to load switch in the centrifugal switch is actuated and opens the circuit to the ignition unit and closes the circuit of the time totalizing meter. If the engine should overspeed, the overspeed shutdown switch in the centrifugal switch is actuated at 105 to 110 percent of engine governed speed, and opens the circuit to the fuel shutoff solenoid valve to stop the flow of fuel to the combustion chamber to stop the engine. During engine starting, the low oil pressure switch is actuated by increasing oil pressure and completes a holding circuit which is opened to shut off fuel flow if the oil pressure drops below a preset minimum pressure during engine operation. The engine air blockage alarm system consists of two switches electrically connected to a warning light on the control panel and to the engine control circuitry. If the negative pressure in the air inlet plenum increases by a determined amount past a set point, one of the switches will light a lamp on the control panel to warn the operator. If the negative pressure continues to increase by a determined amount past the set point, the other switch will shut down the engine.

(*f*) *Lubrication System* (*fig. 1-6*). The engine lubrication system provides pressurized spray and splash lubrication for the gears, shafts, and bearings in the engine. The lubrication system consists of the following components together with interconnecting lines and fittings: an oil pump assembly with integral pressure and scavenge pumps and filter element, oil temperature bulb, oil jet and scavenge fittings, cooling air fan, oil temperature regulator (oil cooler), oil tank, dual pad drive assembly scavenge pump, and low oil pressure switch. The oil pump assembly pumps oil from the oil tank through a filter to the oil jets on the engine. Scavenge oil is pumped from the engine scavenge areas to the oil temperature regulator (oil cooler), where a thermostatic valve bypasses the oil through the oil cooler tubes, if required, then returns the cooled oil to the oil tank. The scavenge oil pump on the dual pad gear box returns scavenge oil from the gear box sump to the oil tank. The cooling air fan directs a portion of the cooling air flow through a duct to the tubes in the oil temperature regulator (oil cooler). The remaining cooling air developed by the cooling fan is ducted to the 400 Hz generator. The low oil pressure switch provides for shutdown of the engine in the event oil pressure should drop below minimum pressure during engine operation.

(2) *Fuel System*. The fuel system filters fuel from the external inlet fitting and supplies it at a constant pressure to the engine fuel control system inlet. The fuel system consists of the following components together with interconnecting lines and fittings: a fuel boost pump to assure constant inlet pressure to the fuel control system, a one gallon fuel tank for fuel reserve during changeover from one external fuel source to another, a fuel float tank incorporating a float switch which initiates unit shutdown to prevent damage to the fuel control in the event the fuel supply is exhausted while the unit is running, a manual push valve for purging air from the fuel float tank, a fuel filter assembly, and a manual push valve for purging air from the fuel inlet system. An additional fuel filter/separator assembly is provided as a power plant accessory component for filtering fuel between the external source and the power plant fuel inlet.

(3) *Generators and Electrical Power Chassis Assemblies.* The 60 Hz and 400 Hz generators are driven by the gas turbine engine dual pad gearbox. The 400 Hz generator is cooled by air supplied from a cooling air fan driven by the engine accessory drive. The 400 Hz generator is a 120 KVA brushless, self-excited generator providing three phase, 120/208V AC, 400 Hz power. The 60 Hz generator is a 12-5 KVA brushless, self-excited generator providing single phase, 120/240V AC, 60 Hz power. The electrical power chassis assemblies include automatic control, and protective and regulating components for both the 60 Hz and 400 Hz AC electrical systems and the 24V DC electrical systems.

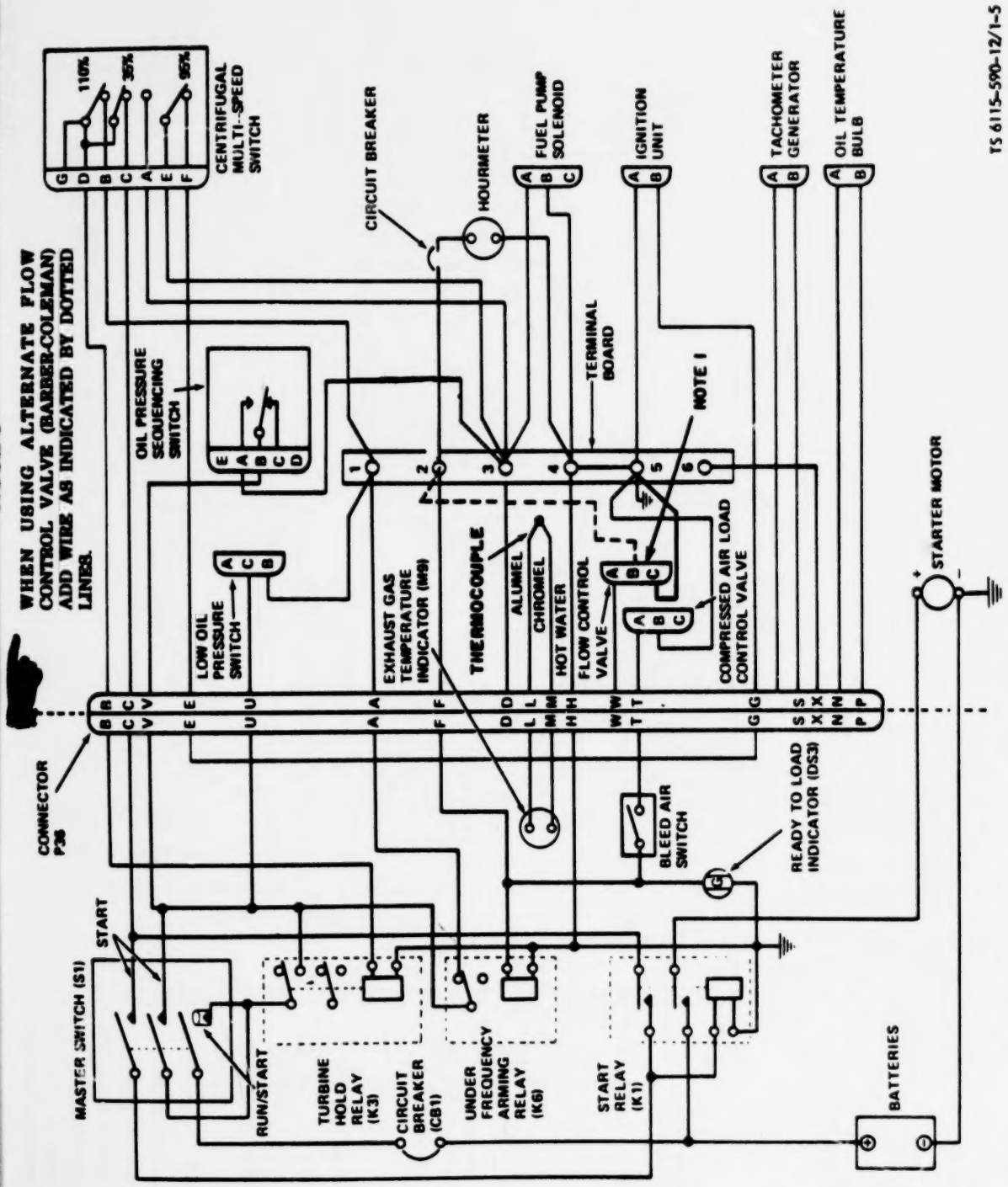


Figure 1-5. Engine Electrical System Schematic. (TS 6115-590-12/1-5).

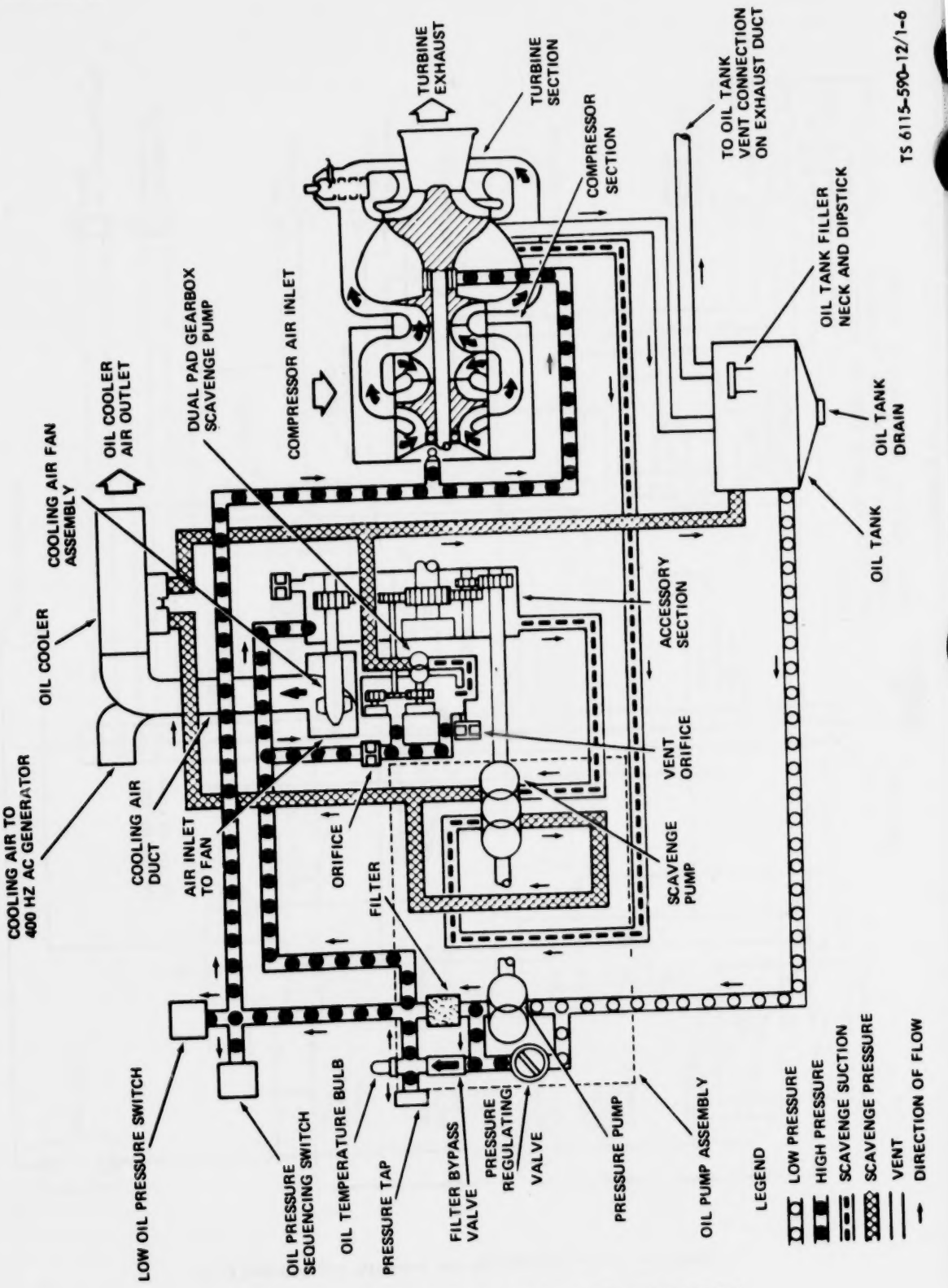


Figure 1-6. Engine Lubrication System Schematic. (TS 6115-590-12/1-6).

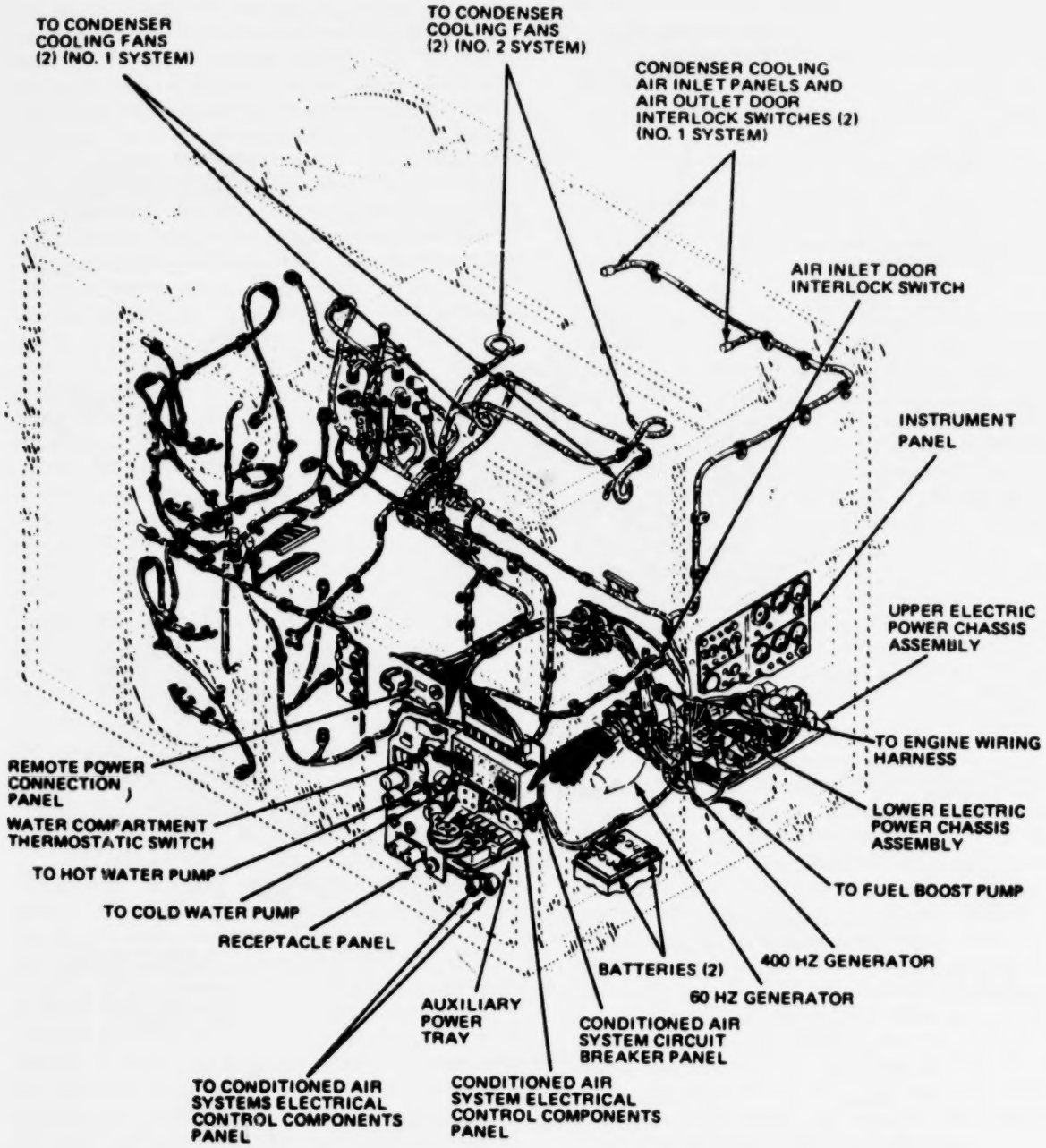

TO CONDENSER COOLING FANS (2) (NO. 1 SYSTEM)
TO CONDENSER COOLING FANS (2) (NO. 2 SYSTEM)
CONDENSER COOLING AIR INLET PANELS AND AIR OUTLET DOOR INTERLOCK SWITCHES (2) (NO. 1 SYSTEM)
AIR INLET DOOR INTERLOCK SWITCH
INSTRUMENT PANEL
UPPER ELECTRIC POWER CHASSIS ASSEMBLY
TO ENGINE WIRING HARNESS
LOWER ELECTRIC POWER CHASSIS ASSEMBLY
TO FUEL BOOST PUMP
400 HZ GENERATOR
60 HZ GENERATOR
BATTERIES (2)
CONDITIONED AIR SYSTEM CIRCUIT BREAKER PANEL
AUXILIARY POWER TRAY
CONDITIONED AIR SYSTEM ELECTRICAL CONTROL COMPONENTS PANEL
TO CONDITIONED AIR SYSTEMS ELECTRICAL CONTROL COMPONENTS PANEL
RECEPTACLE PANEL
TO COLD WATER PUMP
TO HOT WATER PUMP
WATER COMPARTMENT THERMOSTATIC SWITCH
REMOTE POWER CONNECTION PANEL
TS 6115-590-12/1-7 (1)

Figure 1-7. Power Plant Electrical System (Sheet 1 of 2). (TS 6115-590-12/1-7[1]).

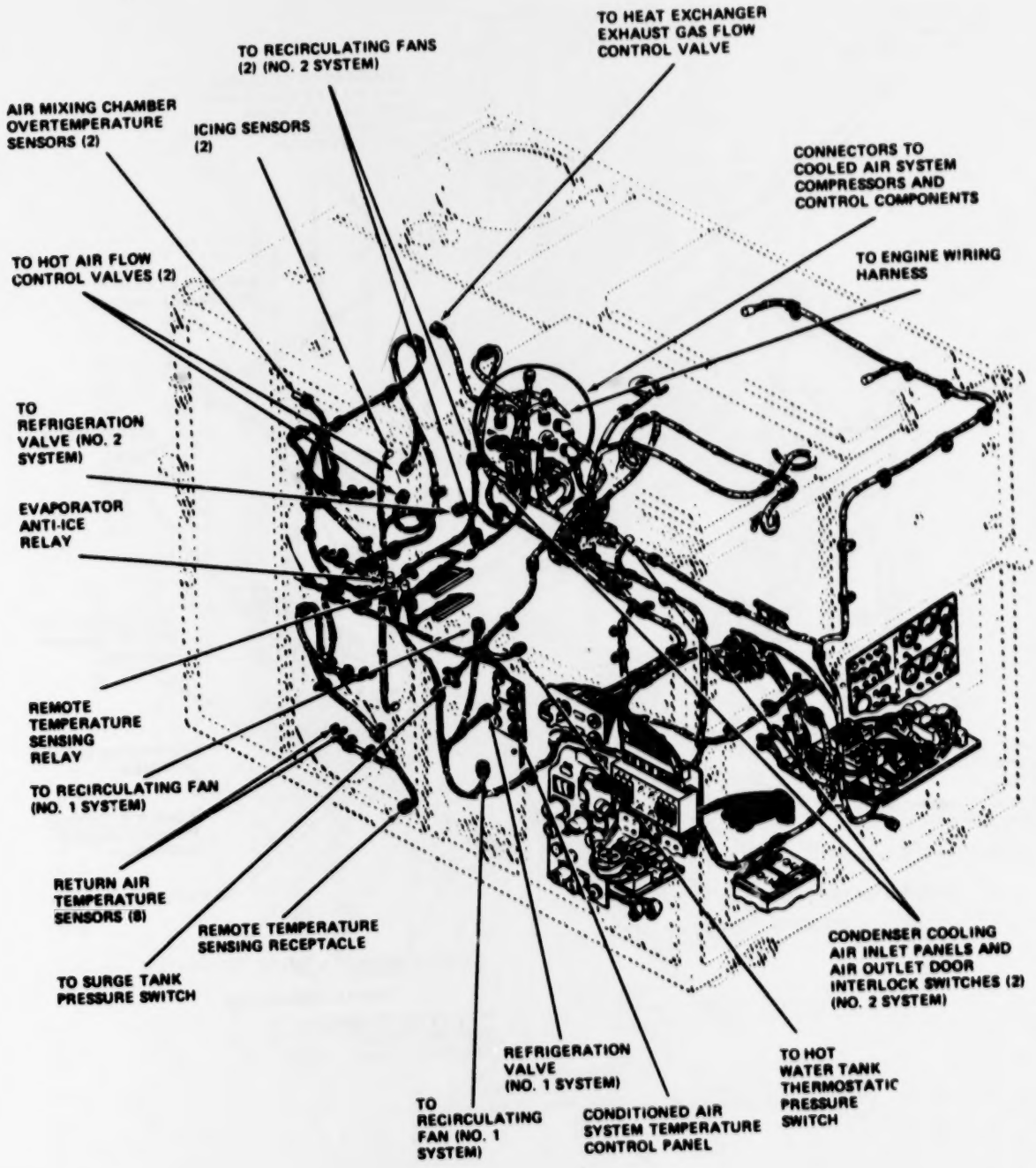

TO HEAT EXCHANGER EXHAUST GAS FLOW CONTROL VALVE
TO RECIRCULATING FANS (2) (NO. 2 SYSTEM)
AIR MIXING CHAMBER OVERTEMPERATURE SENSORS (2)
ICING SENSORS (2)
CONNECTORS TO COOLED AIR SYSTEM COMPRESSORS AND CONTROL COMPONENTS
TO HOT AIR FLOW CONTROL VALVES (2)
TO ENGINE WIRING HARNESS
TO REFRIGERATION VALVE (NO. 2 SYSTEM)
EVAPORATOR ANTI-ICE RELAY
REMOTE TEMPERATURE SENSING RELAY
TO RECIRCULATING FAN (NO. 1 SYSTEM)
RETURN AIR TEMPERATURE SENSORS (8)
REMOTE TEMPERATURE SENSING RECEPTACLE
TO SURGE TANK PRESSURE SWITCH
CONDENSER COOLING AIR INLET PANELS AND AIR OUTLET DOOR INTERLOCK SWITCHES (2) (NO. 2 SYSTEM)
REFRIGERATION VALVE (NO. 1 SYSTEM)
TO HOT WATER TANK THERMOSTATIC PRESSURE SWITCH
TO RECIRCULATING FAN (NO. 1 SYSTEM)
CONDITIONED AIR SYSTEM TEMPERATURE CONTROL PANEL
TS 6115-590-12/1-7 (2)

Figure 1-7. Power Plant Electrical System (Sheet 2 of 2). (TS 6115-590-12/1-7(2)).

c. Power Unit electrical System (fig. 1-7 and FO-1). The power unit electrical system consists of a 24V DC system powered by batteries, a 120/240V AC single phase, 60 Hz system powered by the engine driven 60 Hz generator, and a 120/208V AC three phase, 400 Hz system powered by the engine driven 400 Hz generator. The 24V DC system provides power for engine starting and control, control power for the other power unit systems (electrical, conditioned air and water) control components, and emergency lighting power for other elements of the MUST hospital. The 24V DC emergency light power is distributed through the 60 Hz system convenience receptacles and cable assemblies. The 60 Hz system provides 60 Hz power to elements of the MUST hospital as required. The 400 Hz system provides 400 Hz power for operation of the conditioned air system, water pumps, water hose heating, battery changing, and for 400 Hz power requirements for other elements of the MUST hospital. All of the electrical systems incorporate safety devices to disconnect the electrical output and prevent damage to components in the event of an overload, undervoltage, overvoltage, or underfrequency condition (except 60 Hz system). The power unit includes electrical circuits for connection as a standby unit and will automatically start and deliver power should the operating power unit shut down. The 24V DC system also includes circuits and cable assemblies for connection of an external source of 24V DC power for starting. The power unit may also be connected to another power unit to provide 24V DC and 400 Hz power to the nonoperating power unit for operation of the ventilating fans in the nonoperating unit, provided the cooled air system in the operating unit is not operating.

(1) *24V DC Electrical System (fig. 1-7 and FO-1).* The 24V DC system provides power for engine starting and for the switches, relays, contactors, solenoids, etc., which control opeation of the engine electrical system, 60 Hz and 400 Hz electrical systems, conditioned air system, and water system. The batteries which provide the DC power will also provide up to one hour of emergency light service to other elements of the MUST hospital in the event of engine or electrical system failure. The batteries are recharged through a transformer-rectifier type battery charger powered from the 400 Hz electrical system. Provisions are also incorporated in the 24V DC system to connect an external source of 24V DC power for engine starting in the event the batteries are discharged.

(2) *60 Hz Electrical System (fig. 1-7 and FO-1).* The 60 Hz electrical system provides 120/240V AC, 60 Hz, single phase output power for external requirements. The system consists of a brushless, self-excited, air-cooled generator, a voltage regulator, a generator protective panel, output power convenience receptacles, and interconnecting wiring and connectors. The 60 Hz system neutral conductor is not grounded. Control components in the 60 Hz system are powered from the 24V DC system.

Figure FO-1 Power plant electrical system schematic (Sheet 1 of 2)
(Located in back of manual)

Figure FO-1 Power plant electrical system schematic (Sheet 2 of 2)
(Located in back of manual)

(3) *400 Hz Electrical System (fig. 1-7 and FO-1).* The 400 Hz electrical system provides 120/208V AC, 400 Hz, three phase power for operation of the conditioned air system compressors, condenser cooling fans, air circulating fans, hot and cold water pumps, and water hose heaters, 24V DC battery charger, and for 400 Hz power requirements in other elements of the MUST hospital. The 400 Hz system consists of a brushless, self-excited, air-cooled generator, voltage regulator, generator protective panel, output power receptacles, and interconnecting wiring and connectors. The 400 Hz generator incorporates an integral cooling fan and receives additional cooling air from the engine cooling fan. The 400 Hz system neutral conductor is grounded. Control components in the 400 Hz system are powered from the 24V DC system.

d. Conditioned Air System (fig. 1-8, 1-9, and 1-10). The conditioned air system supplies cooled air, heated air, or ventilating air under slight pressure to other elements of the MUST hospital. The system is a recirculating system with recirculating fans in the return air plenum. Adjustable vents in the return air compartments permit adding make-up air to the system. The conditioned air system consists of a cooled air system, a heated air system, and a ventilating air system. The three systems function independently but use some components interchangeable between systems. The four conditioned air outlets are located at the rear of the power unit and provide connection flanges for attaching the distribution ducts. The four return air inlets are located on the right side of the power unit and provide connection flanges for attaching the return air ducts. Covers are provided for the outlets and inlets when not in use. The four return air inlets are provided with permanent high-velocity-type cleanable air filters. Two temperature sensors are located at each of the four return air inlets to provide temperature control of the output air in response to temperature changes in the return air. Also, a remote temperature sensor may be connected to an electrical connector provided on the

return air inlet panel to provide temperature sensing and control in MUST hospital elements that do not utilize the return air ducts. When remote temperature sensing is not used, a plug with a jumper wire must be plugged into the receptacle on the return air inlet panel.

(1) *Cooled Air System* (*fig. 1-8, 1-9*). The cooled air system uses two independent 10 ton (refrigerating capacity) refrigeration systems for maximum flexibility of operation. The two refrigeration systems may be operated individually or together to provide 20 tons cooling capacity. Each refrigeration system is a vapor cycle closed loop system consisting of an electric-motor-driven refrigerant compressor, two condenser cooling fans, a refrigerant receiver, an expansion valve, an evaporator, two recirculating fans, a refrigeration solenoid valve, a compressor bypass solenoid valve, an overpressure switch, a refrigeration de-icing system, and associated tubing, fittings and refrigerant level sight gages. All electric motors in the refrigeration system are powered by the 400 Hz electrical system and all control components are powered by the 24V DC electrical system. Output temperature control of the refrigeration systems is automatic with variable adjustment provided. Refrigeration output temperature control is accomplished by three solenoid-operated valves, a refrigerant flow control valve, a compressor bypass valve, and a de-icing valve. The de-icing system functions automatically to prevent ice formation on the evaporator core.

(2) *Heated Air System* (*fig. 1-10*). The heated air system uses two independent control and mixing systems connected to a single source of heated air. Each system uses hot compressed air from the gas turbine engine compressor through the engine load control valve. The heated compressed air passes through one or both thermostatically controlled, electrically actuated flow control valves into the mixing chambers. The heated air is mixed with recirculating air from the recirculating fans and is distributed through the air outlet ducts to the elements of the MUST hospital. Output temperature control of the heated air system is automatic with variable adjustment provided. The temperature sensors, installed in the return air inlets, provide automatic temperature control of the output air to the selected temperature by opening and closing the flow control valves to increase or decrease the flow of heated compressed air to the mixing chambers. Overtemperature thermoswitches installed in the mixing chambers, will actuate to close the engine load control valve in the event heated air temperatures exceed safe maximum.

(3) *Ventilating Air System*. The ventilating air system provides for the circulation of air without the addition of heated or cooled air. The system uses the recirculating fans and ducts in the refrigeration systems and heated air systems to circulate ambient temperature air through the other elements of the MUST hospital. Vent openings in the return air inlet panel may be opened as required to admit make-up air.

e. Water System (*fig. 1-11 and 1-12*). The water system, when provided with an external supply of water will deliver hot and cold water under pressure to other elements of the MUST hospital. The water system includes a cold water pump, hot water pump, exhaust-gas-to-water heat exchanger, exhaust gas flow control valve, hot water storage tank, pressure (surge) tank, pressure relief valves, check valves, pressure and temperature control switches, and interconnecting lines and fittings. The cold water pump receives inlet water and delivers the water to the cold water outlet and to the hot water heat exchanger. A surge tank is connected to the cold water system to prevent the noise and effects of water hammer and cycling. The water is heated in the heat exchanger and goes to the hot water storage tank. The hot water pump draws water from the storage tank and delivers it under pressure to the hot water outlet. Pressure switches are utilized to activate the hot and cold water pumps as required to maintain a constant water pressure in the system. A hot water temperature switch controls the positioning of the exhaust gas flow control valve to regulate the flow of exhaust gas to the heat exchanger and maintain a constant water temperature. Temperature and pressure relief valves in the water system protect the system from damage due to excessive temperature and/or pressure. A thermostatic switch in the water tank compartment is used to control a solenoid valve to bleed hot compressed air from the engine compressor into the water tank compartment to prevent freezing during low temperature periods of operation. Drain fittings are provided to completely drain the water system during periods of inoperation.

f. Compressed Air System (*fig. 1-10 and 1-13*). The compressed air system consists of various ducts, valves, and controls utilized to deliver compressed air from the gas turbine engine compressor to the heated air system, water tank compartment, engine air cleaner ejector, vacuum system eductor, and for external pneumatic power requirements. Compressed air to the heated air system is bled off through the engine load control valve which is modulated by a load control thermostat in the engine exhaust to prevent the engine from being overloaded by excessive shaft and pneumatic loads. Compressed

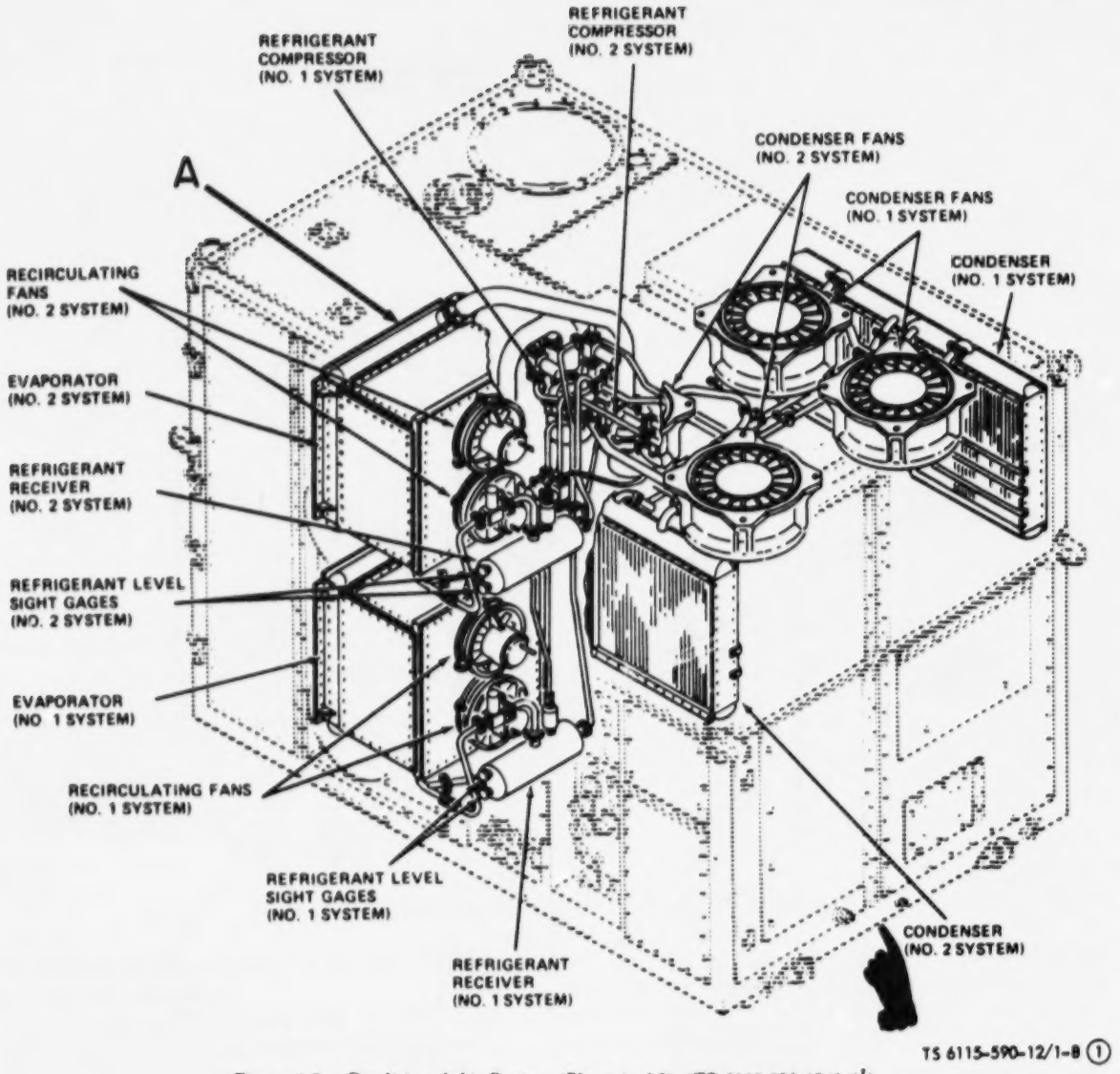

REFRIGERANT COMPRESSOR (NO. 1 SYSTEM)
REFRIGERANT COMPRESSOR (NO. 2 SYSTEM)
A
CONDENSER FANS (NO. 2 SYSTEM)
CONDENSER FANS (NO. 1 SYSTEM)
CONDENSER (NO. 1 SYSTEM)
RECIRCULATING FANS (NO. 2 SYSTEM)
EVAPORATOR (NO. 2 SYSTEM)
REFRIGERANT RECEIVER (NO. 2 SYSTEM)
REFRIGERANT LEVEL SIGHT GAGES (NO. 2 SYSTEM)
EVAPORATOR (NO 1 SYSTEM)
RECIRCULATING FANS (NO. 1 SYSTEM)
REFRIGERANT LEVEL SIGHT GAGES (NO. 1 SYSTEM)
REFRIGERANT RECEIVER (NO. 1 SYSTEM)
CONDENSER (NO. 2 SYSTEM)
TS 6115-590-12/1-8 (1)

Figure 1-8. Conditioned Air System (Sheet 1 of 2). (TS 6115-590-12/1-8[1])

air to the engine air cleaner ejector flows continually to scavenge dust and foreign material separated from the intake air by the engine air cleaner during engine operation. Compressed air to heat the water tank compartment is controlled by a thermostatic switch in the water tank compartment and a solenoid valve in the compressed air line. Compressed air to the vacuum system eductor and to the external pneumatic fitting is controlled by manually operated valves.

g. Vacuum System (fig. 1-10 and 1-14). The vacuum system provides suction for use in other elements of the MUST hospital. The suction or partial vacuum is created by flowing compressed air through an eductor which creates a partial vacuum when air is passed through a venturi shaped section. The compressed air is exhausted from the eductor through a sound attenuated exhaust duct at the top of the power unit enclosure. The vacuum system is controlled by a manually operated valve in the compressed air line to the eductor. The vacuum system consists of an eductor, manual control valve, a sound attenuated exhaust duct, and interconnecting ducts and fittings.

h. Enclosure (fig. 1-1 and 1-2). The enclosure provides support and protection for the various systems and components of the power unit. The enclosure consists of a welded aluminum alloy frame with access doors and removable panels to provide access to controls and instrument panels and to all internal

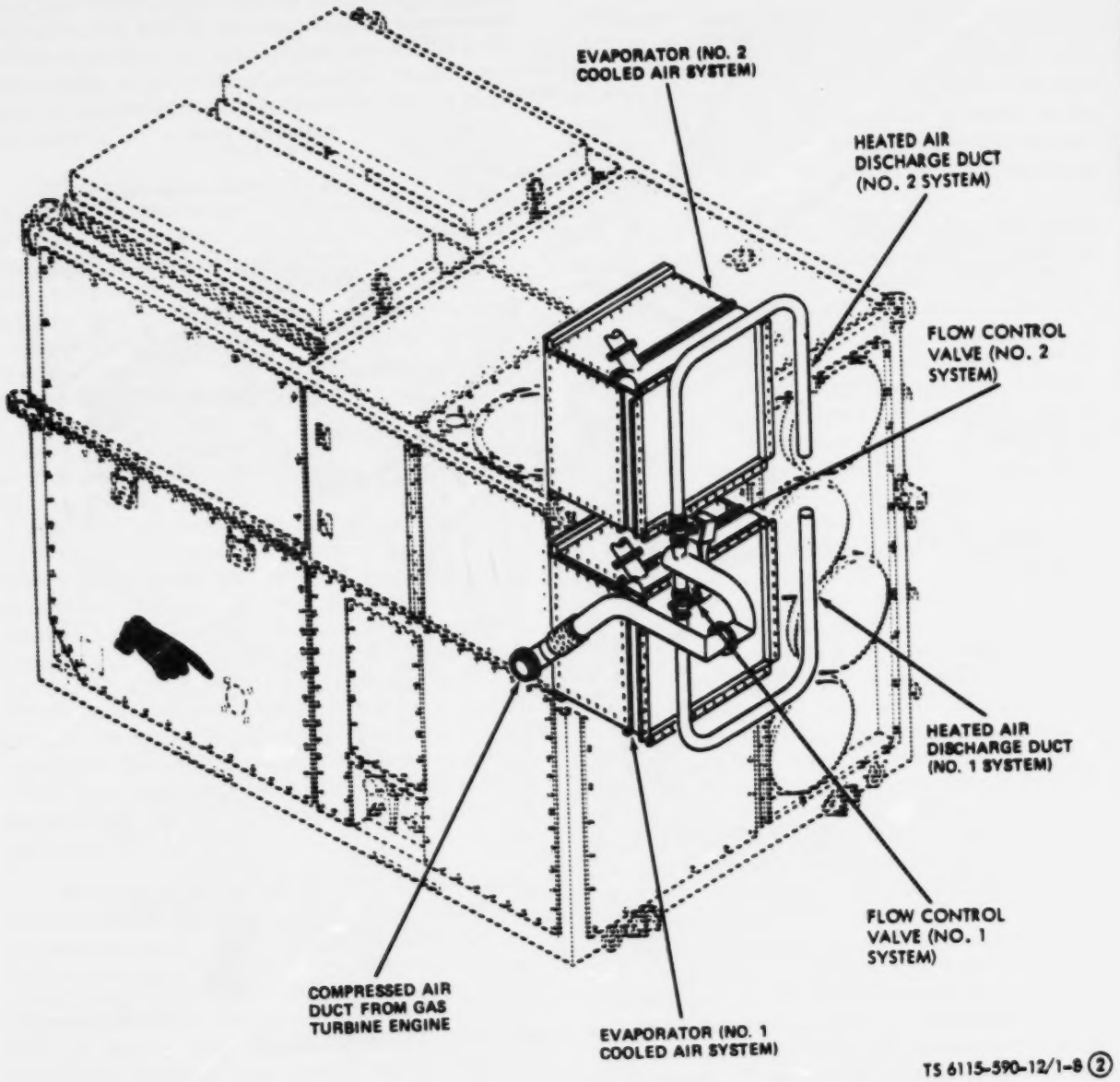

EVAPORATOR (NO. 2 COOLED AIR SYSTEM)
HEATED AIR DISCHARGE DUCT (NO. 2 SYSTEM)
FLOW CONTROL VALVE (NO. 2 SYSTEM)
HEATED AIR DISCHARGE DUCT (NO. 1 SYSTEM)
FLOW CONTROL VALVE (NO. 1 SYSTEM)
COMPRESSED AIR DUCT FROM GAS TURBINE ENGINE
EVAPORATOR (NO. 1 COOLED AIR SYSTEM)
TS 6115-590-12/1-8 (2)

Figure 1-8. Conditioned Air System (Sheet 2 of 2). (TS 6115-590-12/1-8[2]).

components. Internal bulkheads and separating panels provide compartmentalization of the enclosure interior to separate the various systems and components and to provide storage for accessory components. The enclosure access doors, panels, bulkheads, and separating panels are lined with insulating and sound attenuating materials. Suitable openings, doors, and panels are provided in the enclosure to facilitate air intake, exhaust, and service connections to the power unit. The air intake for the gas turbine utilizes a vortex type air cleaner that is scavenged by compressed air with scavenged material and air exhausted at the top of the enclosure. Folding steps are provided at the right rear corner to the enclosure for access to the top of the enclosure. The enclosure is supported on two shock absorbing skids. Tie downs, lift rings, and other connection hardware is provided on the enclosure to facilitate handling and transporting the power unit.

i. Accessory Components (fig. 1-15). The accessory components are those items utilized for power plant operation and connection to other elements of the MUST hospital. These components are supplied with the power unit and are stored in the

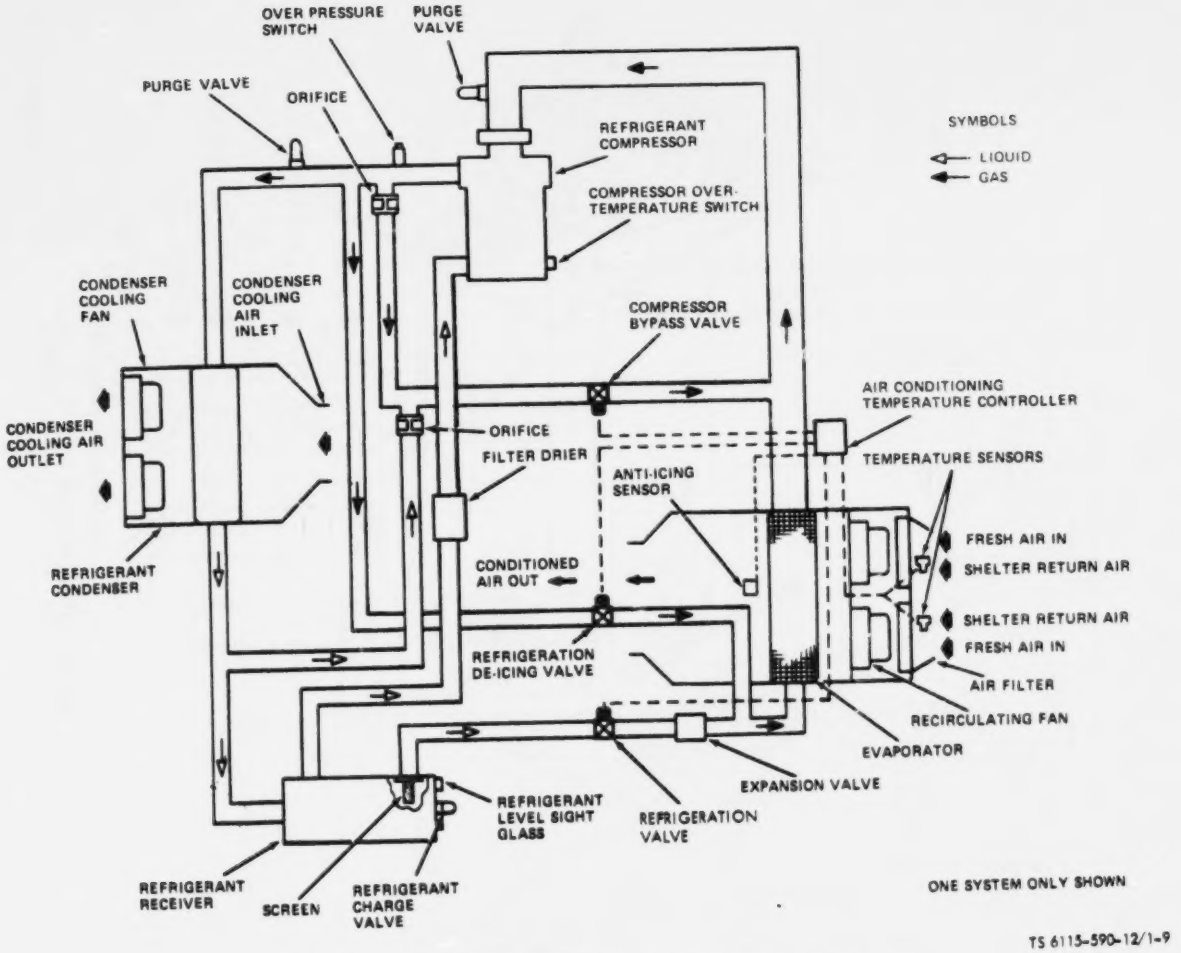


Figure 1-9. Cooled Air System Schematic. (TS 6115-590-12/1-9).

unit for shipment. The accessory components consist of the following items.

(1) One external battery DC power cable assembly for connection of external battery from a military vehicle equipped with a 24V DC output receptacle to the power plant for auxiliary starting power.

(2) One external DC electrical power input cable assembly for connection of an external 24V DC power source.

(3) One DC electrical power input cable assembly for connecting the 24V DC systems of two power units together to provide for standby operation of one power plant.

(4) One 400 Hz auxiliary power cable assembly for connection between power plants for remote operation of ventilating fans.

(5) One 400 Hz electrical power output cable assembly for connection of the power plant 400 Hz electrical system to other elements of the MUST hospital as required.

(6) One 60 Hz electrical power output cable assembly for connection of the power plant 60 Hz electrical system to other elements of the MUST hospital as required.

(7) One compressed air hose assembly for connection of the power plant compressed air outlet to the MUST hospital inflatable elements for delivery of inflation air.

(8) One electrically heated water supply and drain water hose assembly for connection of an external water source to the power plant water system.

(9) One electrically heated dual water hose assembly for connection of the power plant water system to other elements of the MUST hospital.

(10) One inflation ejector assembly used to inflate the inflatable elements of the MUST hospital.

(11) Eight conditioned air duct assemblies for connection of the power plant conditioned air system to other elements of the MUST hospital.

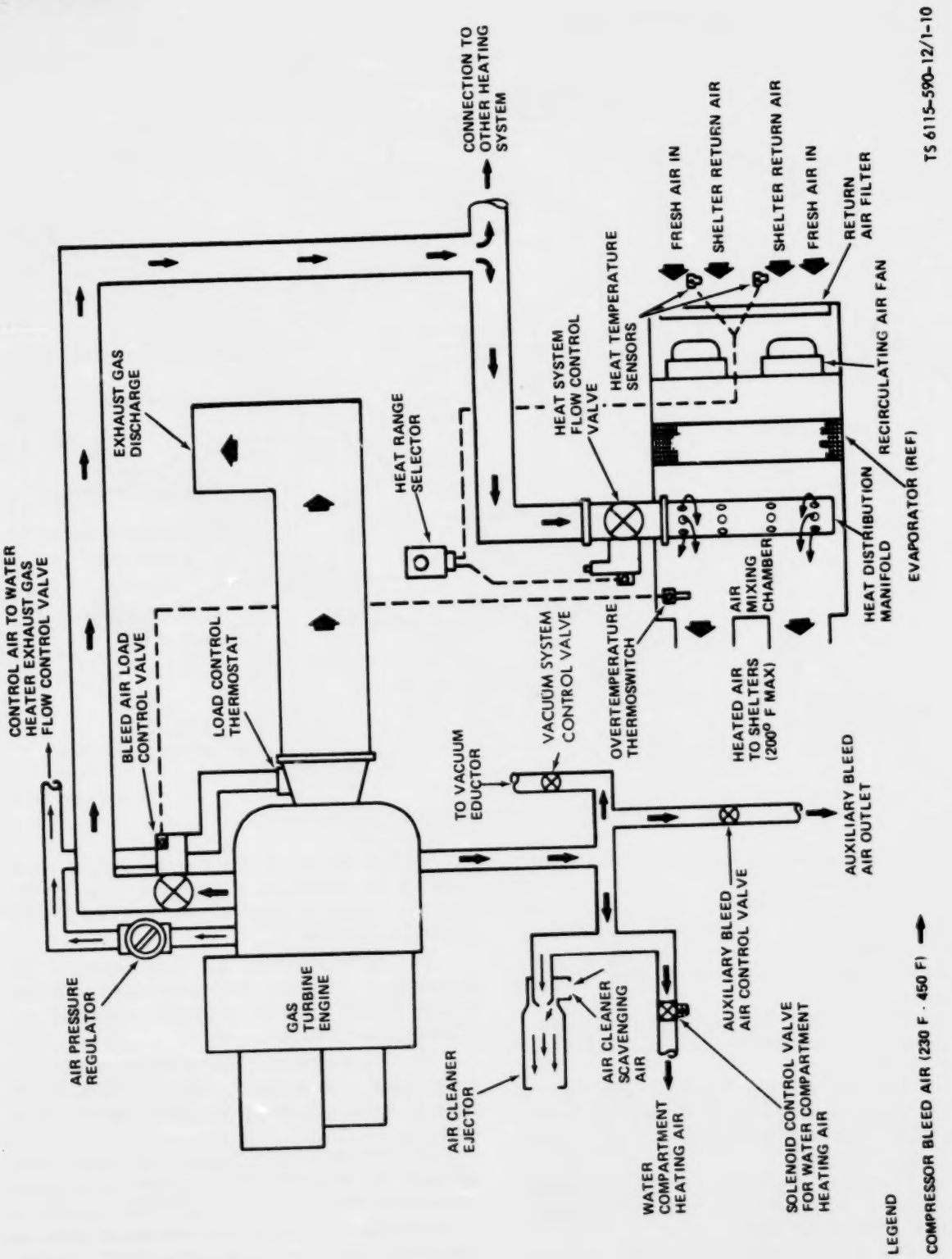


Figure 1-10. Heated Air System Schematic. (TS 6115-590-12/1-10).

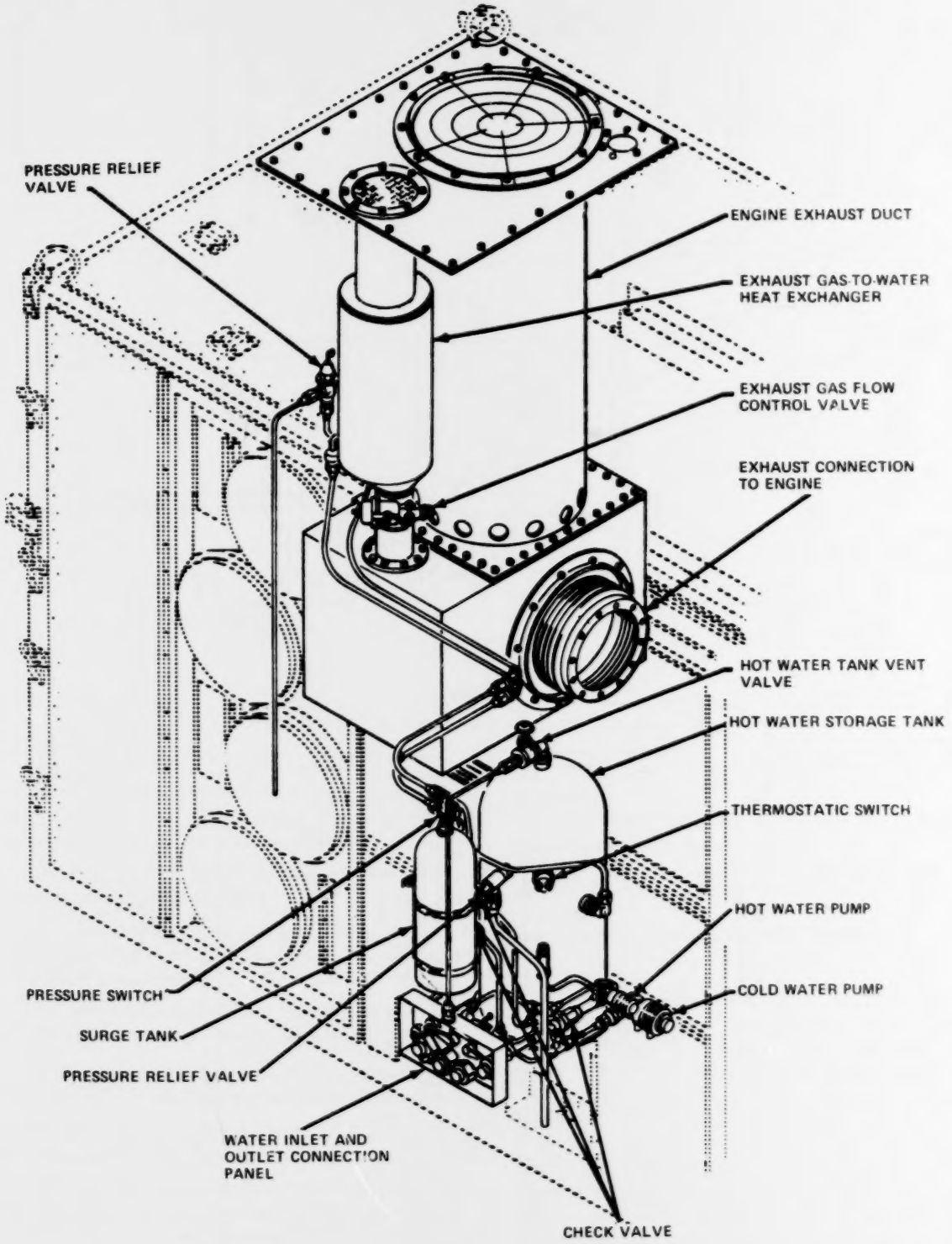


Figure 1-11. Water System. (TS 6115-590-12/1-11).

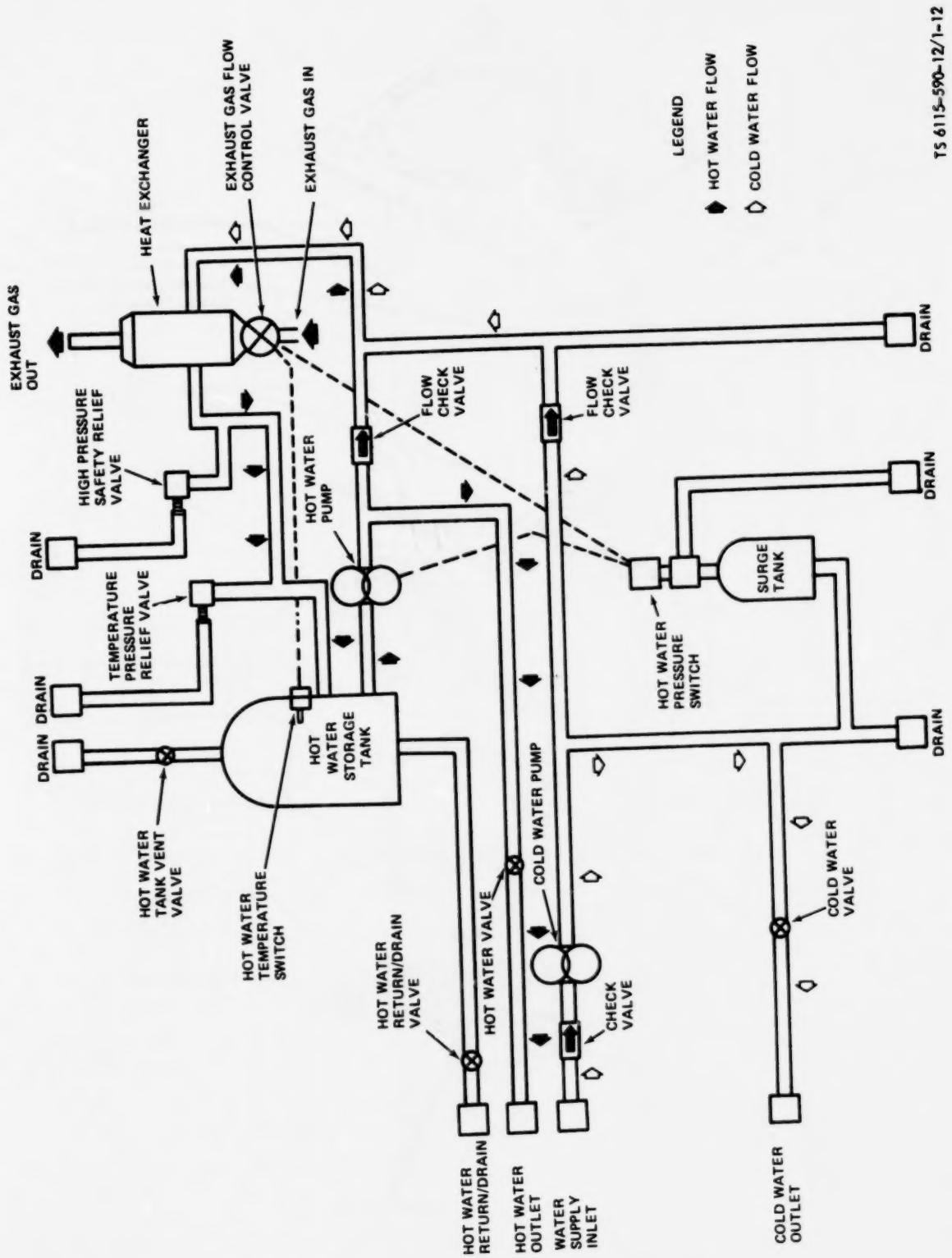


Figure 1-12. Water System Schematic. (TS 6115-590-12/1-12).

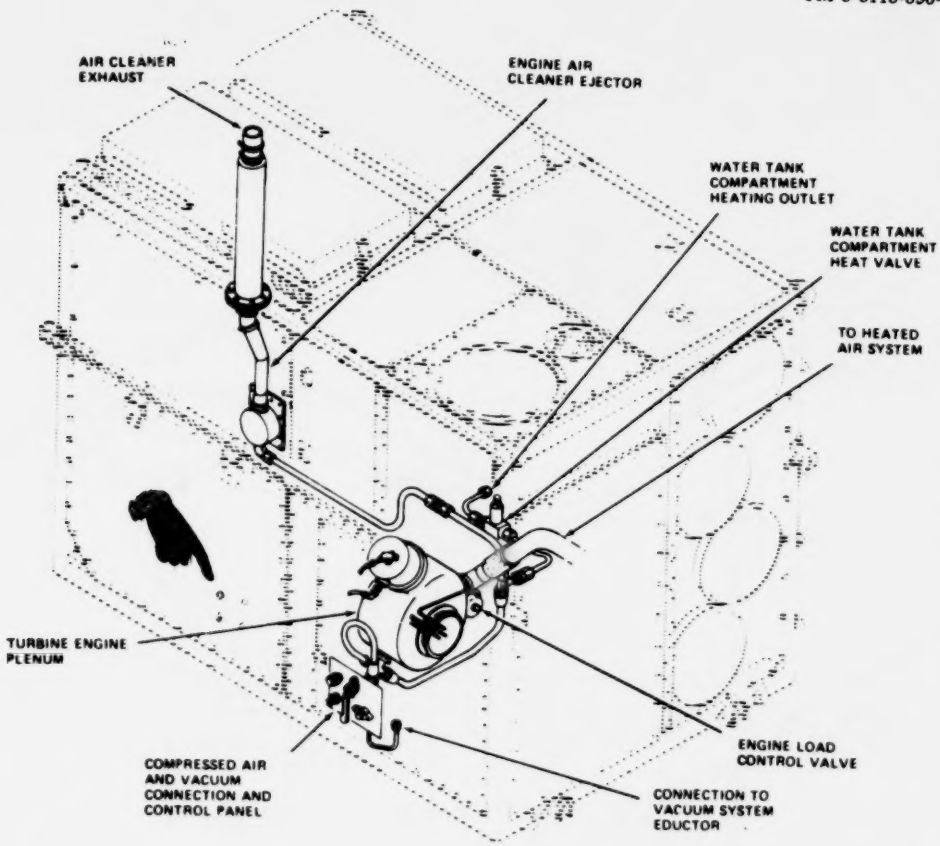

AIR CLEANER EXHAUST
ENGINE AIR CLEANER EJECTOR
WATER TANK COMPARTMENT HEATING OUTLET
WATER TANK COMPARTMENT HEAT VALVE
TO HEATED AIR SYSTEM
TURBINE ENGINE PLENUM
ENGINE LOAD CONTROL VALVE
COMPRESSED AIR AND VACUUM CONNECTION AND CONTROL PANEL
CONNECTION TO VACUUM SYSTEM EDUCTOR
TS 6115-590-12/1-13

Figure 1-13. Compressed Air System. (TS 6115-590-12/1-13).

(12) Four conditioned air duct clamp assemblies used to join the air conditioning duct assemblies together as required for additional length.

(13) One divider panel to separate the conditioned air outlet compartment.

(14) One vacuum hose assembly for connection of the power plant vacuum system to other elements of the MUST hospital that require vacuum service.

(15) One external fuel filter/separator assembly for filtering inlet fuel to the power plant.

(16) One fuel hose assembly for connecting the fuel outlet of the filter/separator to the power plant.

(17) One fuel hose assembly for connecting the fuel source to fuel inlet of the filter/separator.

(18) One fuel hose assembly for extending the inlet hose from the fuel source to the filter/separator.

(19) One water recirculating hose to permit the circulation of water to prevent freezing.

(20) One cable adapter for connecting two standby cables together to gain added length when required.

(21) One ground rod for connecting the power plant to earth ground.

(22) One anti-icing hose for the engine air filter de-icer. (See item 7 of fig. 1-15, sheet 3 of 7).

1-6. Differences Between Models.

This manual covers Power Plant, Utility, Gas Turbine Engine Driven, AiResearch Co. Model PPU85-5, Libby Welding Co. Model LPU-7, Amertech Corp. Model APP-1, and Hollingsworth Model JHTWK10/96. This manual reflects the configuration of the Hollingsworth Model. PIP-1-80-08-007 is to be installed on the AiResearch Model, the Libby Welding Model, and the Amertech Model which will bring these models (except for minor differences), up to the Hollingsworth configuration. The Hollingsworth power plant has a different source of supply for the evaporator and condenser fan motors, heat control valves for heating (air conditioning), and for the water pumps.

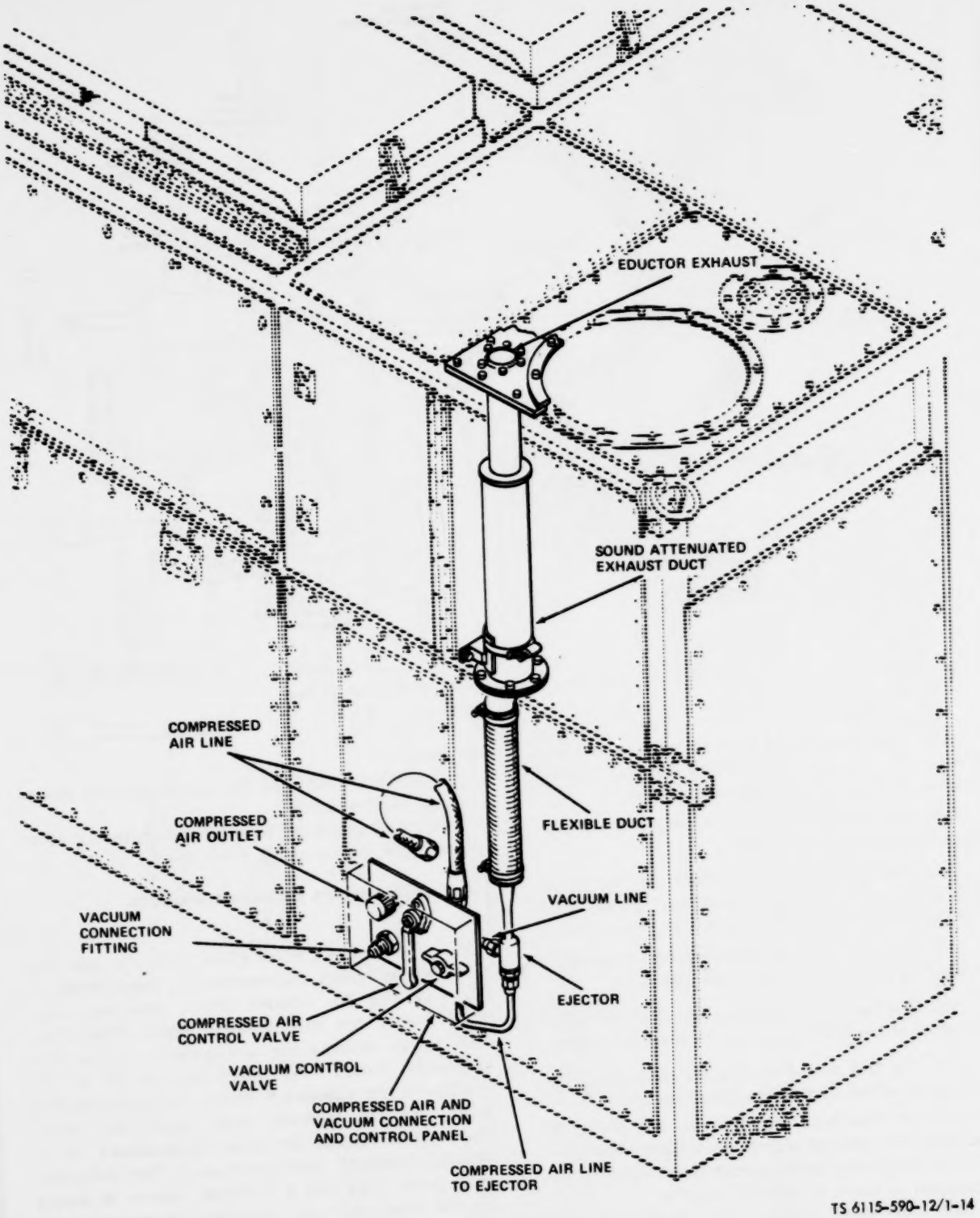


Figure 1-14. Vacuum System. (TS 6115-590-12/1-14).

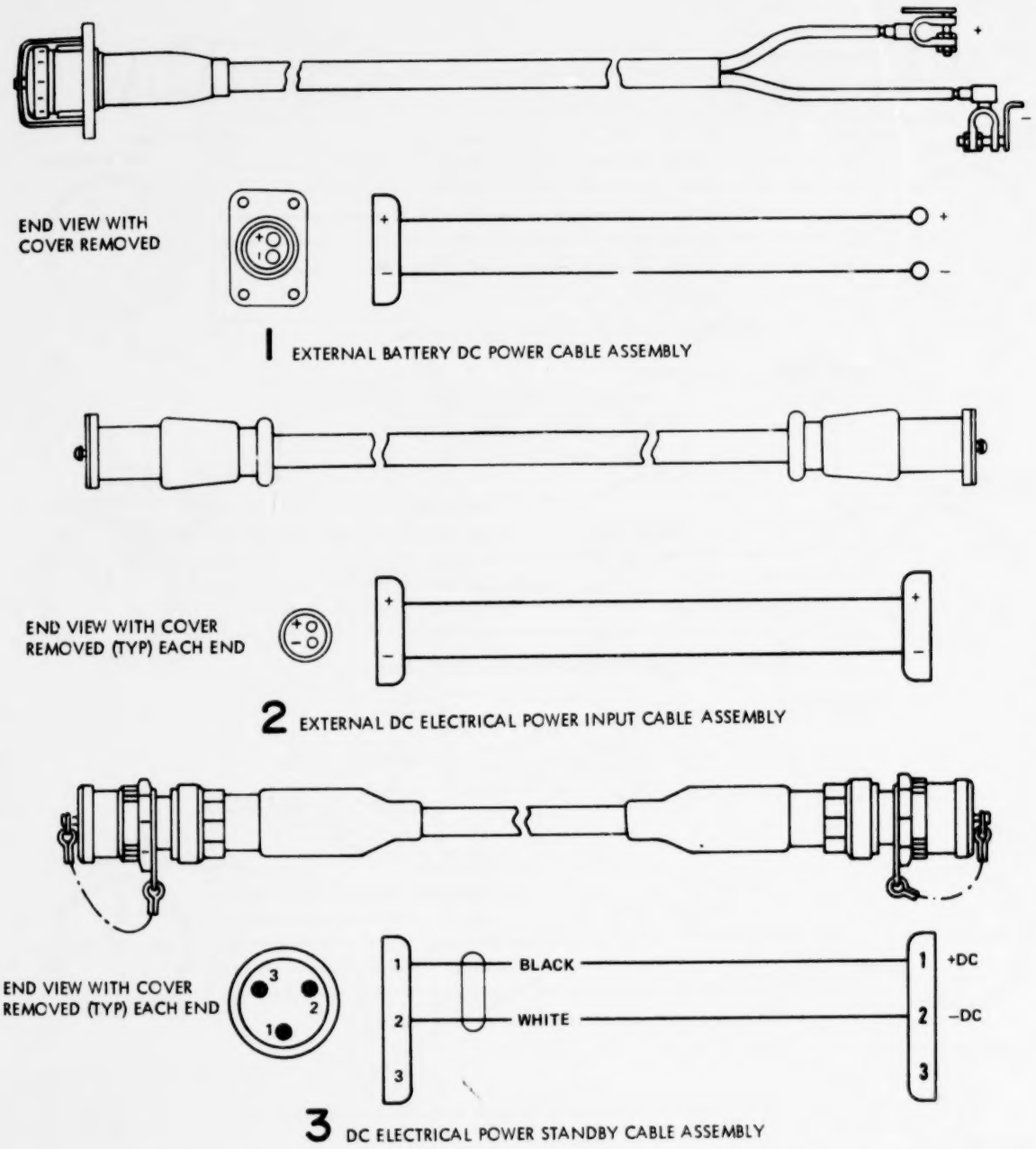

END VIEW WITH COVER REMOVED
1 EXTERNAL BATTERY DC POWER CABLE ASSEMBLY
END VIEW WITH COVER REMOVED (TYP) EACH END
2 EXTERNAL DC ELECTRICAL POWER INPUT CABLE ASSEMBLY
END VIEW WITH COVER REMOVED (TYP) EACH END
BLACK
WHITE
+DC
–DC
3 DC ELECTRICAL POWER STANDBY CABLE ASSEMBLY
TS 5116-590-12/ 1-15 (1)

Figure 1-15. Accessory Components (Sheet 1 of 7). (TS 6115-590-12/1-15[1]).

1-7. Tabulated Data.

a. Identification. The power plant has 14 major identification plates and 11 major instruction plates.

(1) *Power plant identification plate.* Located on the right side of the unit above the electrical connection panel. Specifies the nomenclature, stock number, serial number, part number, model number, contract number and manufacturer.

(2) *Gas Turbine Engine identification plate.* Located on the engine accessory drive housing on the left side. Specifies nomenclature, part number, serial number, and manufacturer.

(3) *400 Hz generator.* Located on left side of generator housing. Specifies nomenclature, part number, sytle, rated rpm, frequency, serial number,

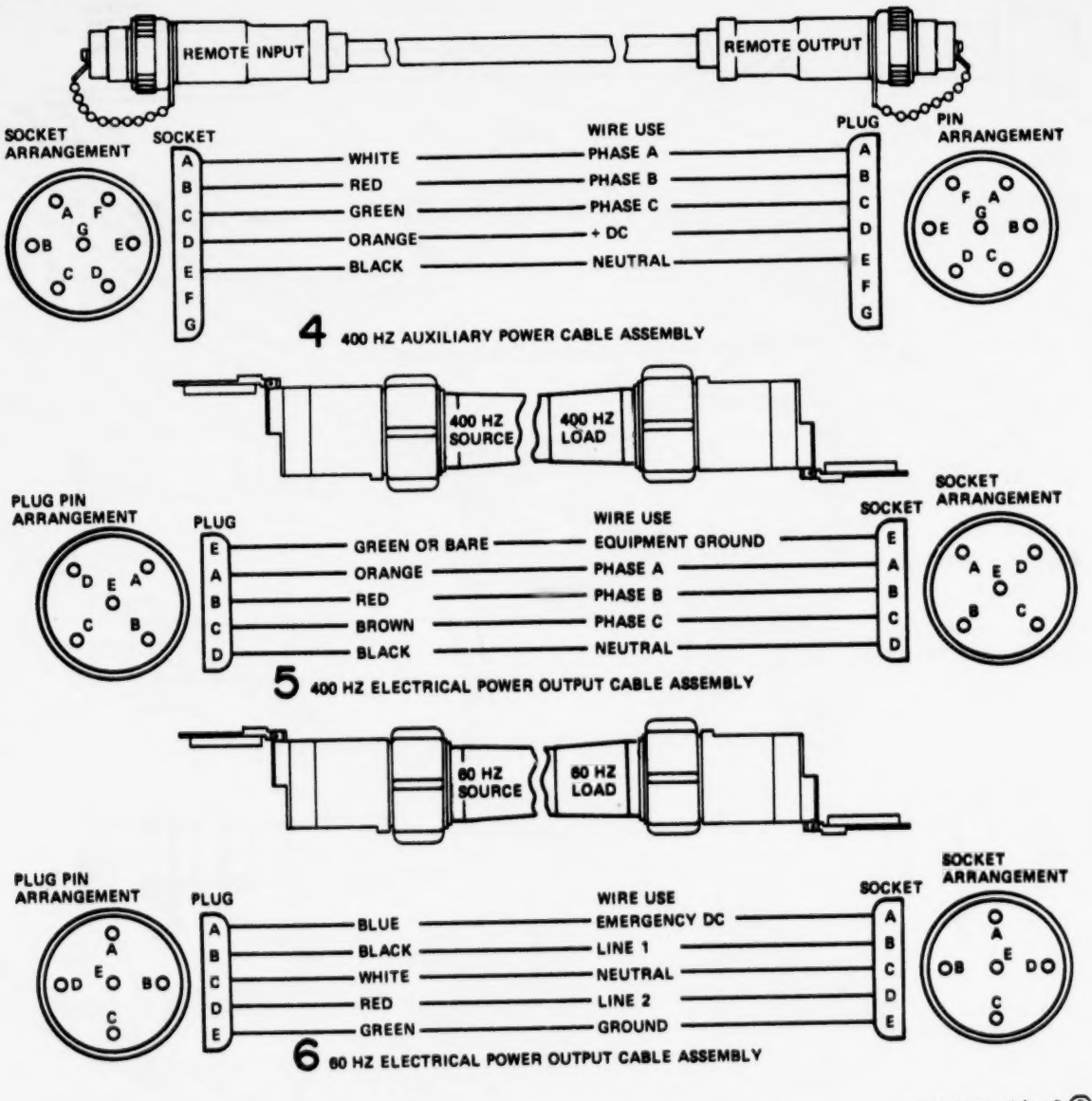


Figure 1-15. Accessory Components (Sheet 2 of 7). (TS 6115-590-12/1-15[2]).

kva (kilovolt amperes) rating, P/F (power factor), ampere rating, voltage, and manufacturer.

(4) *60 Hz generator.* Located on side of generator housing. Specifies nomenclature, part number, style, rated rpm, frequency, serial number, kva rating, P/F, ampere rating, voltage, and manufacturer.

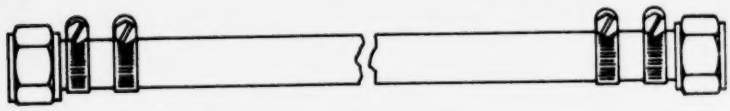
(5) *Refrigeration compressors (2 used).* Located on compressor inlet housing. Specifies nomenclature, serial number, part number, voltage, cycles, phase, amperes, duty cycle, rpm, refrigerant, rating, evaporator temperature, condenser temperature, and manufacturer.

(6) *Evaporators (2 used).* Located on top of evaporator tank. Specifies nomenclature, part number, and manufacturer.

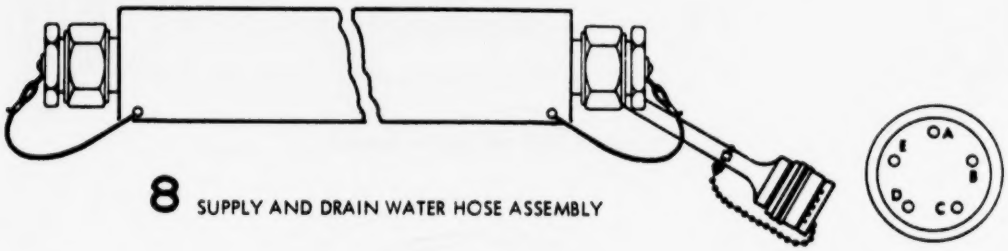
(7) *Condensers (2 used).* Located on condenser frame. Specifies nomenclature, part number, and manufacturer.

(8) *Refrigerant receivers (2 used).* Located on side of receiver tank. Specifies nomenclature, part number, serial number, and manufacturer.

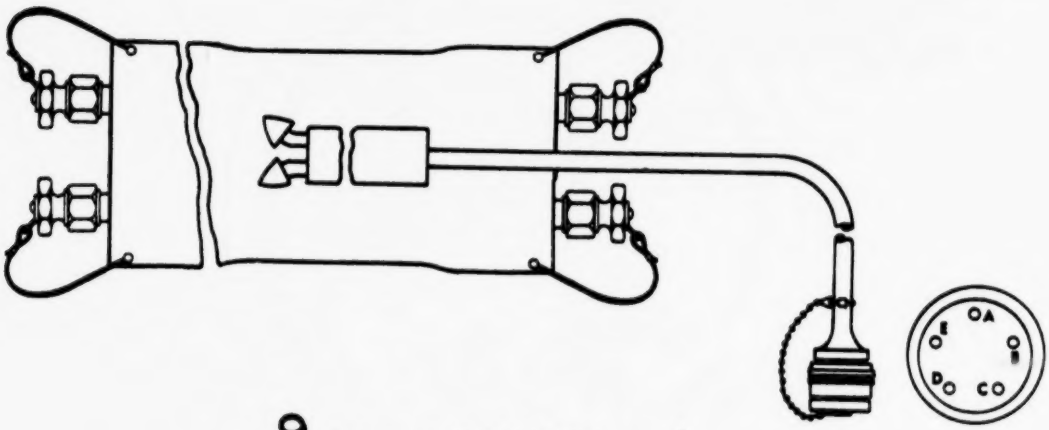
(9) *Condenser fans (4 used).* Located on fan motor housing. Specifies nomenclature, airflow rating, part number, serial number, voltage, frequency, phase, rpm, and manufacturer.



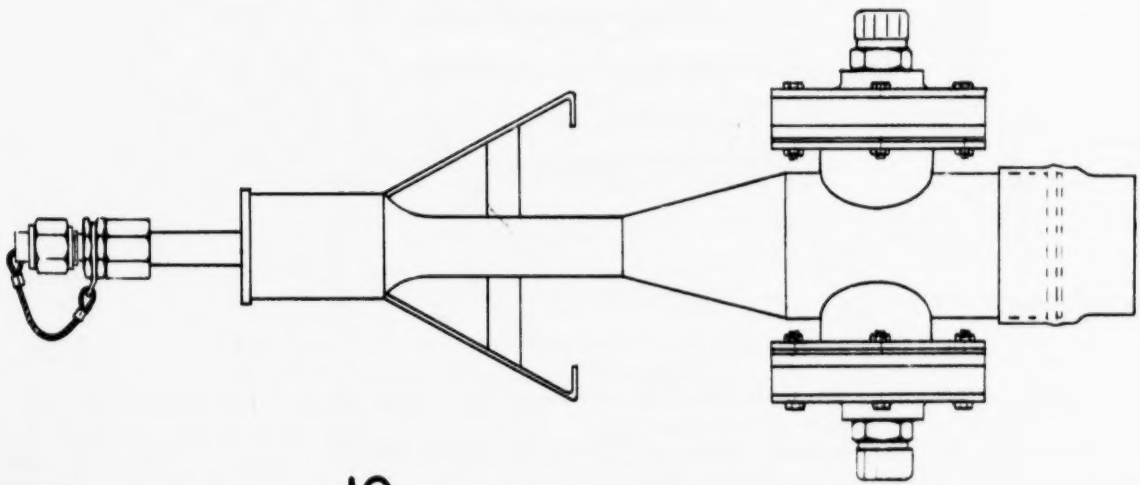
7 COMPRESSED AIR HOSE



8 SUPPLY AND DRAIN WATER HOSE ASSEMBLY



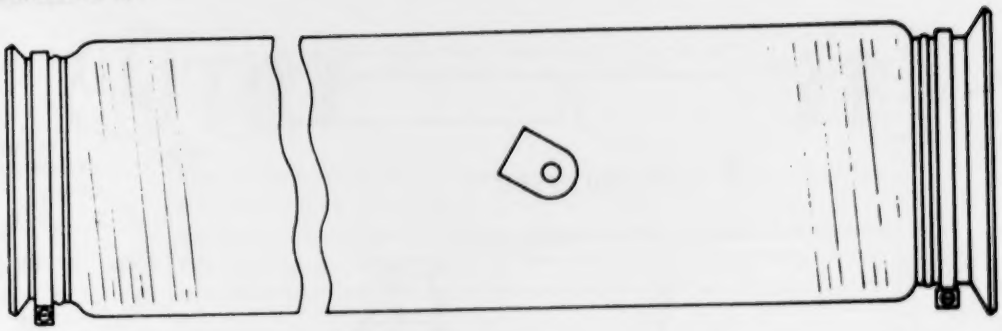
9 DUAL WATER HOSE ASSEMBLY



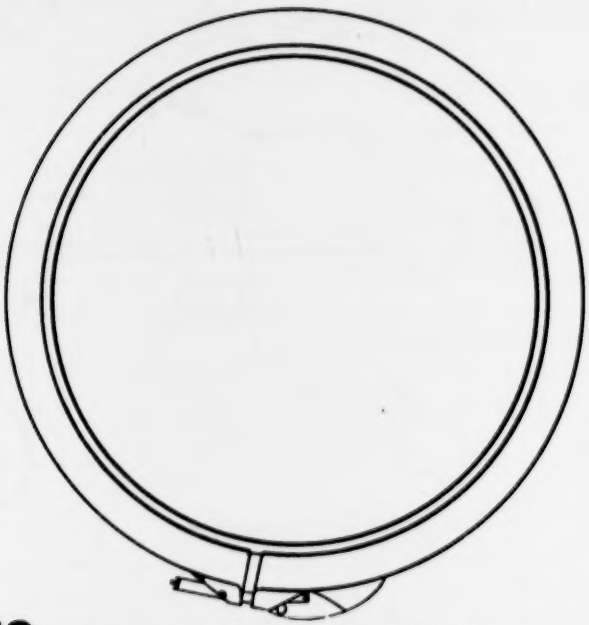
10 INFLATION EJECTOR ASSEMBLY

TS 6115-590-12/1-15 (3)

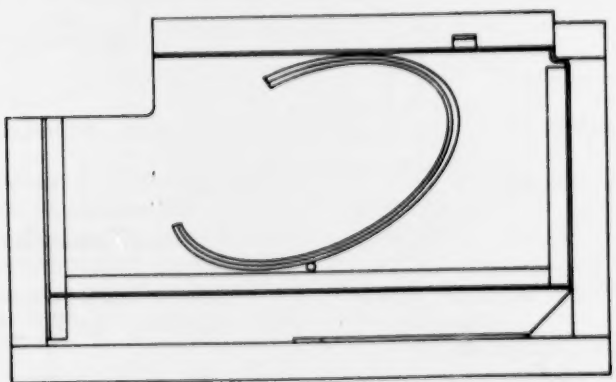
Figure 1-15. Accessory Components (Sheet 3 of 7). (TS 6115-590-12/1-15[3]).



11 CONDITIONED AIR DUCT ASSEMBLY



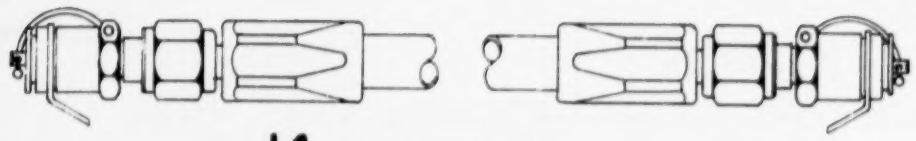
12 CONDITIONED AIR DUCT CLAMP ASSEMBLY



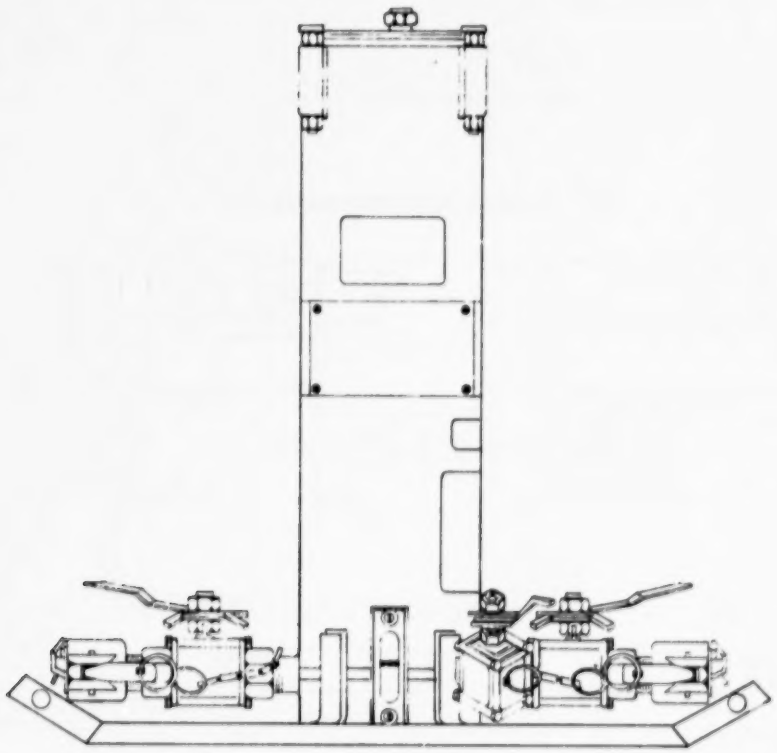
13 CONDITIONED AIR OUTLET COMPARTMENT DIVIDER

TS 6115-590-12/1-15 (

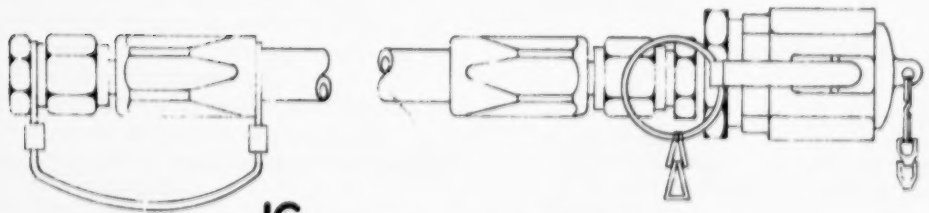
Figure 1-15. Accessory Components (Sheet 4 of 7). (TS 6115-590-12/1-15[4]).



14 VACUUM HOSE ASSEMBLY



15 EXTERNAL FUEL FILTER/SEPARATOR



16 EXTERNAL FUEL HOSE ASSEMBLY

TS 6115-590-12/1-15 (5)

Figure 1-15. Accessory Components (Sheet 5 of 7). (TS 6115-590-12/1-15[5]).

(10) *Ventilating fans (4 used).* Located on fan motor housing. Specifies nomenclature, airflow rating, part number, voltage, amperes, frequency, phase, rpm, and manufacturer.

(11) *60 Hz voltage regulator.* Located on regulator cover. Specifies nomenclature, voltage, Hz, phase, part number, style, serial number, and manufacturer.

(12) *400 Hz voltage regulator.* Located on regulator cover. Specifies nomenclature, part number, style, serial number, and manufacturer.

(13) *Battery charger.* Located on charger enclosure. Specifies nomenclature, model number, input, output, part number, and manufacturer.

(14) *Exhaust gas to water heat exchanger.* Located on side of tank. Specifies nomenclature, part number, and manufacturer.

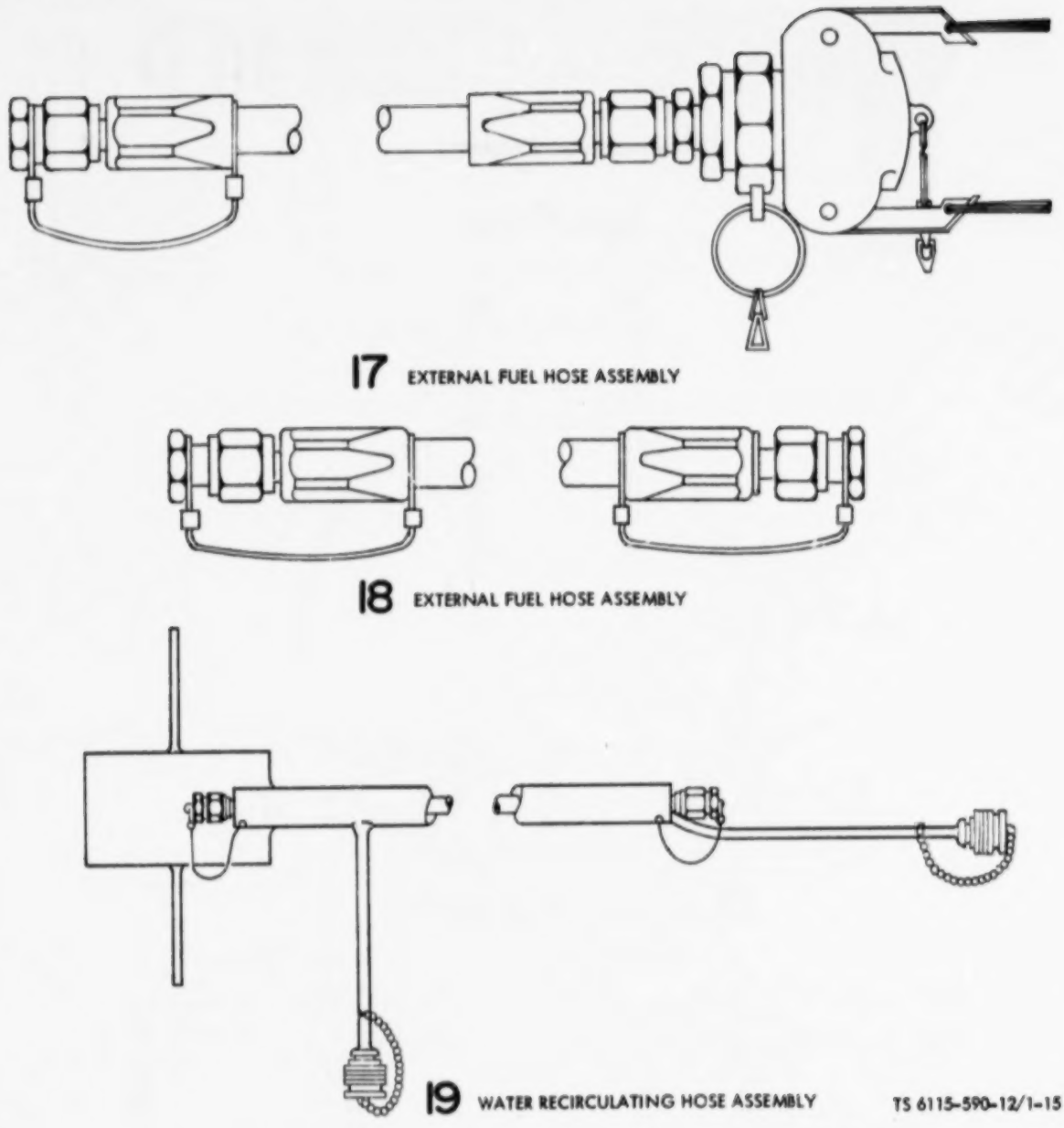


Figure 1-15. Accessory Components (Sheet 6 of 7). (TS 6115-590-12/1-15[6]).

(15) *Operating instructions decal.* Located on inside of controls and instruments panel access door. Provides instructions for operating the power unit.

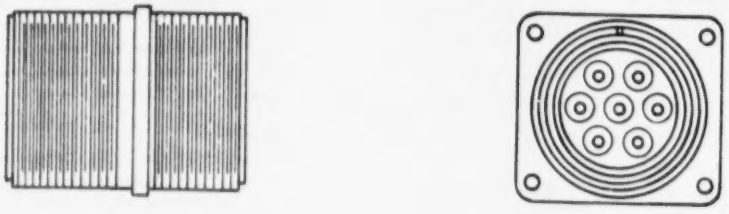
(16) *Fuel inlet decal.* Located on lower left front corner of enclosure above fuel inlet fitting. Provides recommended and emergency fuels specifications.

(17) *Oil fill door decal.* Located on oil fill access door. Specifies lubricating oil specification and oil change period.

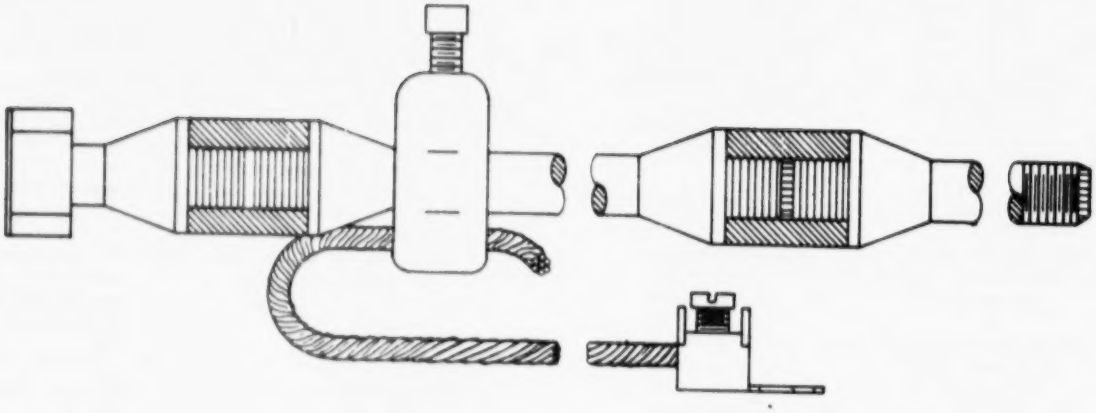
(18) *Engine oil label.* Located on oil tank above filler cap. Specifies engine oil system capacity.

(19) *Refrigeration label.* Located on inside of refrigeration compressor compartment above refrigeration compressors, in condenser compartments, and in refrigerant receiver compartments. Provides warning as to refrigerant to be used.

(20) *Remote sensor decal.* Located in the lower right corner of the return air panel adjacent to the remote temperature sensing connector. Provides caution instructions pertaining to installation of shorting plug in connector.



20 REMOTE CABLE ADAPTER



21 GROUND ROD ASSEMBLY TS 6115-590-12/1-15 (7)

Figure 1-15. Accessory Components (Sheet 7 of 7). (TS 6115-590-12/1-15[7]).

(21) *Turbine air inlet compartment stowable items label.* Located on the inside wall of the compartment. Provides instructions for storing accessory components in the compartment.

(22) *Upper left condenser compartment stowable items label.* Located on the floor of the compartment. Provides instructions for storing accessory components in the compartment.

(23) *Upper right condenser compartment stowable items label.* Located on the floor of the compartment. Provides instructions for storing accessory components in the compartment.

(24) *Compressor compartment stowable items label.* Located on the floor of the compartment. Provides instructions for storing accessory components in the compartment.

(25) *Conditioned air outlet compartment stowable items label.* Located on the inside of the door to the compartment. Provides instructions for storing accessory components in the compartment.

b. Tabulated data.

(1) *Overall dimensions and weights*

Overall length (operating)	145.00 in. (368.3 cm)
Overall length (storage or shipping)	115 IN. (292.1 CM)
Overall width (operating)	112.00 in. (284.49 cm)
Overall width (storage or shipping)	75 IN. (190.5 CM)
Overall height (operating)	112.00 in. (284.49 cm)
Overall height (storage or shipping)	92 IN. (233.68 CM)
Net weight empty (dry)	3,800 lb. (pounds) (max) (1735.2 Kg)
Net weight filled (accessory components stowed)	4,700 lb. (max) (2133.8 Kg)
Shipping volume	460 CU. IN. (7538.09 CU.CM.) MAX
Shipping weight	4,700 lb. (max) (2133.8 Kg)

(2) Gas turbine engine
Manufacturer.....AiResearch Manufacturing Company of Arizona
Part number.....380278-1
Model number.....GTCP85-127
Type.....Combination pneumatic and shaft power
Turbine wheel type.....Single stage, radial inward flow
Compressor type.....Two stage centrifugal
Combustion chamber.....Single reverse flow tube

Acceleration time to governed speed.....60 seconds (max)
Inlet air temperature.....130°F(54°C) (max)
(a) Fuel requirements
Recommended Fuels
Jet fuel, grade JP-4.....MIL-T-5624
(-65° to 140°F)
(-54° to 60°C)
Jet fuel, grade JP-5.....MIL-T-5624
(-30° to 140°F)
(-34° to 60°C)
Turbine fuel, grade JP-8...MIL-T-83133
(-40° to 140°F)
(-40° to 60°C)
Compression ignition fuel..MIL-F-46005
(-30° to 140°F)
(-34° to 60°C)
Oil, diesel, grade DF2.....W-F-800
(30° to 140°F)
(-1° to 60°C)
Oil, diesel, grade DFA.....W-F-800
(-65° to 140°F)
(-54° to 60°C)
Kerosene.....EMS 309
(-30° to 140°F)
(-34° to 60°C)
Fuel oil, diesel marine....MIL-F-16884
(30° to 140°F)
(-1° to 60°C)

Emergency Fuels (50 hours continuous operation maximum).

NOTE

Power unit performance will be satisfactory but use of the following fuels will result in increased gas turbine engine maintenance.

Gasoline, automotive combat.....MIL-G-3056
(-65° to 140°F)
(-54° to 60°)
Gasoline, aviation grades 80/87, 100/130, 115/145.....MIL-G-5572
(-65° to 140°F)
(-54° to 60°C)

(b) *Lubrication requirements*
Lubricating oil MIL-L-7808 (Below -25°F Ambient)
MIL-L-23699 (Above -25°F Ambient)

Lubricating system capacity (oil system)	10 U.S. quarts (9.46 liters)
(oil change)	8 U.S. quarts (7.568 liters)
Oil change period	500 hours
Oil temperature, starting	-65° to 140°F (-54 to 60°C)
Oil temperature, operating	255°F (124°C) (max)
Oil pump discharge pressure	90 +10 psig
Oil consumption	0.25 pounds per hour (max) (113.37 gm)

(c) Exhaust gas temperatures
Continuous operation, rated full load.....1225°F (663°C) (max)
Transient conditions.....1300°F (704°C) (max)
Acceleration controls.....1240° to 1260°F (671° to 682°C)
Load control thermostat....1025° to 1075°F (552° to 579°C)

(d) Operating speeds
Turbine wheel governed speed, rated full load (100 percent).....40,700 ±100 rpm
Turbine wheel governed speed, no load.....41,600 (max)
Overspeed shutdown switch actuation.....44,250 ±250 rpm
Engine output shaft speed.....6000 rpm
Speed ratio, turbine wheel to tachometer generator drive.....9,806 to 1.0

(3) 24V DC electrical system
Batteries (2 required connected in series).....12V, 45 ampere hour lead-acid per MIL-B26220 and MS35000, 2HN

Battery charger:
Manufacturer.....Amertech Corp., Phoenix, Arizona
Part number.....13217E3993
Model number.....BC-100
Input.....208V, 400 Hz, 3 phase
Output.....28V DC, 30 amps
Type.....Transformer-rectifier

Engine starter motor:
Manufacturer.....AiResearch Manufacturing Company of Arizona
Part number.....372697-9
Current.....600 amp (momentary)
Duty cycle.....One minute on, four minutes off, or five starts in ten minutes.

Fuel boost pump:
Manufacturer.....AiResearch Manufacturing Company of Arizona
Part number.....371240-2
Discharge pressure.....15.0 psig (max)
Current requirements.....2.0 amps
Engine electrical system power requirements (until light-off).....7.5 amps

Emergency lighting power requirements.....10.0 amps
Fuel boost pump (alternate):
Manufacturer.....Stanadyne
Part number.....20633
Discharge pressure.....15.0 psig (max)
Current requirements.....3.25 amps
Volts.....24V
ERDL.....13217E4034

(4) 60 Hz electrical system
Rating.....120/240V AC, 60 Hz single phase, 3-wire
Neutral conductor.....Ungrounded
Internal 60 Hz power requirements.....None
Power available for external requirements.....12.5 kva, 10kw at 0.80 pf

Generator:
Manufacturer.....Bendix Corp., Red Bank Div.
Part number.....51B8-3-A
PMG (permanent magnet generator) voltage.....23 ±1V
Type.....Single phase, 3 wire
P/F (power factor).....0.80
KVA.....12.5
KW.....10.0
Frequency.....60 Hz
Volts.....120/240V
Amps (100% load).....53
Rated rpm.....3,600
Weight.....118 lb. (53.37 Kg)

Voltage regulator:
Manufacturer.....Bendix Corp., Red Bank Div.
Part number.....20B123-1
Style.....B
Type.....Solid State
Volts.....120/240
Frequency.....60 Hz
Phase.....1
Adjustable range.....115 to 125 volts line to neutral
Sensing.....Average phase with high phase limiting on overvoltage. Average phase with low phase control on undervoltage.

(5) 400 Hz electrical system
Rating.....120/208V AC, 400 Hz three phase, 4-wire
Neutral conductor.....Grounded
Output:
Total.....120 kva, 96 kw at 0.80 P/F
External with air conditioning or heating.....30 kw
External with no air conditioning or heating.....90 kw

Refrigeration compressor power requirement, each (2 in system).....19.5 kw (nominal)
Condenser cooling fan power requirement, each (4 in system).....4.9 kw
Recirculating fan power requirement, each (4 in system).....1.95 kw
Water pump power requirement, each (2 in system).....0.23 kw
Generator:
Manufacturer.....Bendix Corp., Red Bank Div.
Part number.....28B94-15-A
Style.....A
PMG voltage.....29 ±1
Type.....Three phase, 4 wire
P/F.....0.80
KVA.....120
KW.....96
Frequency.....400 Hz
Volts.....120/208
Amps (100% load).....333
Rated rpm.....6000
Weight.....133 lb. (60.38 Kg)

Voltage regulator:
Manufacturer.....Bendix Corp., Red Bank Div.
Part number.....20B100-2
Style.....A
Type.....Solid State
Volts.....120/208
Frequency.....400 Hz
Phase.....3
Adjustable range.....115 to 125 volts line to neutral
Sensing.....Average 3 phase

(6) Conditioned air system
Heating capacity (at sea level and ambient temperature-25°F (-4°C)).....350,000 btu/hr
Cooling capacity, each system (two systems used).....10 tons (approx) (120,000 btu/hr with 460 cfm make-up air at 120°F (49°C))
Refrigerant specification.....R114 (Federal Specification BB-F-671)

Refrigerant capacity:
System no. 1 (lower).....39 lb. (approx) (17.7 Kg)
System no. 2 (upper).....36 lb. (approx) (16.3 Kg)

Refrigerant operating pressure.....70 to 90 psig
Refrigerant maximum pressure.....135 ±7 psig
Refrigeration oil capacity:
System no. 1 (lower).....590 cc (approx) (1.24 pt)
System no. 2 (upper).....540 cc (approx) (1.14 pt)

System no. 1 (lower for recharge only).....197 cc (approx) (.42 pt)

System no. 2 (upper for recharge only).....180 cc (approx) (.38 pt)

Refrigeration compressors:
(2 used)
Manufacturer.....AiResearch Manufacturing Company of Los Angeles
Part number.....572030-1-2
Type.....Two stage centrifugal
Rpm.....23,300
Duty Cycle.....Continuous
Volts.....120/208
Frequency.....400 Hz
Phase.....3
Amps.....60

Refrigerant receivers:
(2 used)
Manufacturer.....AiResearch Manufacturing Company of Los Angeles
Part number.....184270-1-1

Refrigerant receivers:
(2 used)
Manufacturer.....AiResearch Manufacturing Company of Los Angeles
Part number.....184260-1-1
Type.....Aluminum plate fin

Refrigerant evaporators:
(2 used)
Manufacturer.....AiResearch Manufacturing Company of Los Angeles
Part number.....184250-1-1
Type.....Aluminum plate fin

Condenser cooling fan:
(4 used)
Manufacturer.....AiResearch Manufacturing Company of Los Angeles
Part number.....605890-3-1
Type.....Single stage, axial flow
Rating.....5500 cfm at 2.15 in. of H_2O static pressure
Rpm.....3800
Volts.....120/208
Frequency.....400 Hz
Phase.....3
Amps.....15

Condenser cooling fan (alternate):
(4 used)
Manufacturer.....Sunstrand Aviation, Div. of Sunstrand Corp. Rockford, Ill.
Part number.....185618-100
Type.....Single stage, axial flow
Rating.....5500 cfm at 2.15 in. of H_2O static pressure
Rpm.....3800
Volts.....120/208
Frequency.....400 Hz
Phase.....3
Amps.....15
Watts.....3750
ERDL.....13217E4072

Recirculating fan:
(4 used)
Manufacturer.....AiResearch Manufacturing Company of Los Angeles
Part number.....605370-1-2
Type.....Single stage axial flow
Rating.....1620 cfm at 3.45 in. of H_2O static pressure
Rpm.....5700
Volts.....120/208
Frequency.....400 Hz
Phase.....3
Amps.....6.0

Recirculating fan (alternate):
(4 used)
Manufacturer.....Sunstrand Aviation, Div. of Sunstrand Corp. Rockford, Ill.
Part number.....185617-100
Type.....Single stage, axial flow
Rating.....1620 cfm at 3.45 in. of H_2O static pressure
Rpm.....5750
Volts.....120/208
Frequency.....400 Hz
Phase.....3
Amps.....6.0
Watts.....1600
ERDL.....13217E4071

(7) Water System
Pump, motor driven, (cold water)
Manufacturer.....Skurka Engineering Co.
Part number.....A675-CD659
Volts.....208
Amps.....2.2
H.P.....0.5
Phase.....3
Frequency.....400 Hz
Rpm.....11,000
Flow.....12 gpm
Hot water pressure at outlet connection.....10 psig
Hot water flow (with no cold water flowing).....6 gpm
Cold water pressure at outlet connection.....10 psig
Cold water flow (with no hot water flowing).....9 gpm

Heat exchanger heating capacity.....60,000 btu/hr at sea level and ambient temperature -65°F (-54°C)
Hot water storage tank capacity.....15 gal (approx)
Hot water temperature.....140° to 160°F (60° to 72°C)
Temperature-pressure relief valve setting.....200°F (93°C), 75 psig
High pressure relief valve setting.....100 psig
Hot water pressure switch actuation:
Close on use to.....10 psig
Open on decrease at..... 5 psig

(8) Compressed air system
Normal external discharge pressure.....55 to 110 in. Hg A
Pressure through inflation ejector.....1.5 psig (min)
Flow through inflation ejector.....200 scfm (min)

(9) Vacuum system
Vacuum source.....Compressed air through eductor
Suction by eductor.....10 scfm at 18 to 20 in. Hg A

(10) Engine fuel and bleed-air systems schematic. Refer to figure 1-4.
(11) Engine electrical system schematic. Refer to figure 1-5.
(12) Engine lubrication system schematic. Refer to figure 1-6.
(13) Power plant electrical system schematic. Refer to FO-1 located in back of manual.
(14) Cooled air system schematic. Refer to figure 1-9.
(15) Heated air system schematic. Refer to figure 1-10.
(16) Water system schematic. Refer to figure 1-12.
(17) Instrument panel wiring diagram. Refer to figure FO-2 located in back of manual.
(18) Engine and skid assembly wiring diagram. Refer to figure FO-3 located in back of manual.
(19) Conditioned air system wiring diagram. Refer to figure FO-4 located in back of manual.

CHAPTER 2
OPERATING INSTRUCTIONS

Section I. Operating Procedures

WARNING

If equipment fails to operate, refer to trouble-shooting procedures in Chapter 4.

2-1. General

This section describes, locates, illustrates and provides sufficient information about the controls and instruments for proper operation of the power plant.

2-2. Gas Turbine Engine Controls and Instruments

The purpose of the engine controls and instruments and normal and maximum indications of the instruments are described below. The engine controls and instruments are grouped in the lower left corner of the instrument panel (see fig. 2-1).

a. Battery Charging Ammeter.

(1) *Description.* Dial pointer gauge, calibrated to indicate -30 to +30 DC amperes in 1 ampere increments.

(2) *Purpose.* To indicate the battery charging current during operation of power plant.

(3) *Indication.* Battery charging current of about +11 amps after initial engine start, charging current of +2 to +5 amps after a short period of power plant operation.

b. Fuel Line Heater Circuit Breaker.

(1) *Description.* A press-to-reset circuit breaker button installed in the fuel line heater circuit.

(2) *Purpose.* Provide short circuit and overload protection for a fuel line heater circuit. The circuit breaker opening amperage (10 amps) is marked on the reset button. (Use only with units with winterization kit installed.)

c. Fuel Line Heater Indicator Lamp.

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that the fuel is sufficiently warm for engine starting. (Use only with units with winterization kit installed.)

d. Fuel Heater Switch.

(1) *Description.* A three position toggle switch.

(2) *Purpose.* To energize a fuel line heater circuit. (Use only with units with winterization kit installed.)

e. Fuel Boost Pump Switch.

(1) *Description.* A two position, solenoid-held, on-off toggle switch.

(2) *Purpose.* Energizes the fuel boost pump to deliver fuel to the engine fuel control unit at a constant pressure (15 psig). Will trip to OFF position when master switch is in RUN or START position.

f. Exhaust Gas Temperature Indicator.

(1) *Description.* Dial pointer gauge, calibrated to indicate 0° to 1800°F in 100° increments to 900°F, 50° increments from 900°F to 1500°F, and 100° increments from 1500°F to 1800°F. The scale is colored green from 0° to 1225°F and red from 1225°F to 1800°F.

(2) *Purpose.* To indicate exhaust gas temperature in the engine exhaust pipe during operation.

(3) *Indication.* Exhaust gas temperature shall not exceed 1260°F during engine acceleration or 1225°F during steady-state operation at full load.

g. Ready to Load Indicator Lamp.

(1) *Description.* A filament type press-to-test lamp with a green lens.

(2) *Purpose.* Illuminates to indicate that gas turbine engine has accelerated to approximately 95 percent of governed speed and is ready for application of load.

h. Emergency Operation Indicator Lamp.

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that the emergency operation switch is on and that the power unit is operating with protective devices bypassed.

i. Emergency Operation Switch.

(1) *Description.* A two position on-off toggle switch. A red lockout guard is installed over the switch to prevent accidental actuation of the switch.

(2) *Purpose.* Used in emergencies to bypass protective devices, except overspeed switch, and permit continued operation.

WARNING

The emergency operation switch must be in OFF position, with the red lockout guard in the closed (down) position. It should be used only in extreme emergencies when need for continued operation justifies risk incurred in loss of equipment, and possible injury to personnel.

j. Master Switch.

(1) *Description.* A three position toggle switch, spring-loaded return from the up (START) position to the center (RUN) position.

(2) *Purpose.* Energizes the engine power circuit and provides a momentary start circuit until appropriate holding relays are actuated to auto-

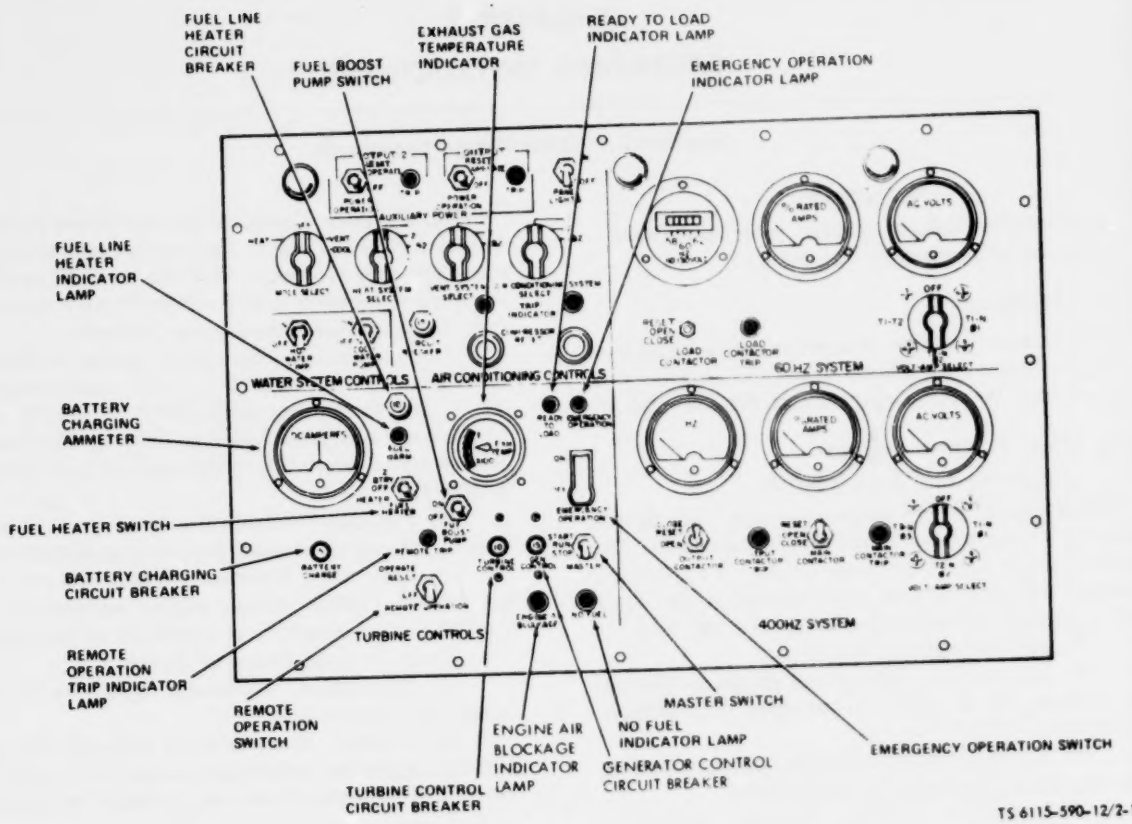


Figure 2-1. Instrument Panel (Gas Turbine Engine Controls and Instruments) (TS 6115-590-12/2-1)

matically complete the starting sequence. The master switch also functions as an engine stop switch by de-energizing the engine 24V DC control circuit when placed in OFF position.

CAUTION

Do not hold master switch in start position after engine starts to rotate.

k. Generator Control Circuit Breaker.

(1) *Description.* A press-to-reset circuit breaker installed in the 60 Hz and 400 Hz generator control circuits.

(2) *Purpose.* Provide short circuit and overload protection for the generator control circuits. The circuit breaker opening amperage (15 amps) is marked on the reset button.

l. Turbine Control Circuit Breaker.

(1) *Description.* A press-to-reset circuit breaker installed in the engine control circuit.

(2) *Purpose.* Provides short circuit and overload protection for the engine control circuit. The circuit breaker opening amperage (10 amps) is marked on the reset button.

m. Remote Operation Switch.

(1) *Description.* A three position toggle switch.

(2) *Purpose.* When placed in the OPERATE RESET position, the switch completes a circuit to reset and close an output contactor to deliver power to a nonoperating power plant for operation of the ventilating fans in the nonoperating unit. The switch returns to the center position when released. When placed in the OFF position, the switch opens the remote output contactor to stop power output to the nonoperating unit.

n. Remote Operation Trip Indicator Lamp.

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that the remote power output contact has tripped to open and disconnected the remote load.

NOTE

Press-to-test feature only operates when unit is operating and 400HZ contactor is closed.

o. Battery Charge Circuit Breaker.

(1) *Description.* A press-to-reset circuit breaker installed in the battery charging circuit.

(2) *Purpose.* Provides short circuit and overload protection for the battery charging circuit. The circuit breaker opening amperage (5 amps) is marked on the reset button.

p. No Fuel Indicator Lamp.

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that power plant has been shut down by fuel float tank switch due to exhaustion of fuel supply.

q. Engine Air Blockage Indicator Lamp.

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that there is a negative pressure differential in the air inlet plenum.

r. Engine Time Totalizing Meter.

(1) *Description.* A five-digit time totalizer counter installed on the side of the engine accessory drive gearcase.

(2) *Purpose.* Records the total engine operating time.

(3) *Indication.* The counter digits indicate the total operating time in hours and tenths of an hour since the last resetting of the dials. The time totalizing meter is energized and begins recording the operating time when the rpm reaches approximately 95 percent of governed speed and continues until engine shutdown.

s. Engine Time Totalizing Meter Circuit Breaker.

(1) *Description.* A press-to-reset circuit breaker installed in the engine time totalizing meter circuit. Located directly below the engine time totalizing meter.

(2) *Purpose.* Provides short circuit and overload protection for the time totalizing meter circuit. The circuit breaker opening amperage (3 amps) is marked on the reset button.

2-3. Water Systems Controls

The description and function of the manually operated controls in the water system are described below. Water system controls are located on the upper left of the instrument panel (fig. 2-2), and on the water inlet and outlet connection panel (fig. 2-19).

a. Hot Water Pump Switch.

(1) *Description.* A two position ON and OFF circuit breaker toggle switch.

(2) *Purpose.* Energizes the hot water pump electrical circuit when placed in the ON position. De-Energizes the pump circuit when placed in the OFF position. Provides short circuit and overload protection for the hot water pump. Control of the pump is automatic depending upon hot water delivery requirements after the switch is placed in the ON position.

b. Cold Water Pump Switch.

(1) *Description.* A two position ON and OFF circuit breaker toggle switch.

(2) *Purpose.* Energizes the cold water pump electrical circuit when placed in the ON position. De-energizes the pump circuit when placed in the OFF position. Provides short circuit and overload protection for the cold water pump.

c. Cold Water Valve.

(1) *Description.* A manually operated valve installed across the cold water outlet line.

(2) *Purpose.* Controls the flow of cold water from the cold water outlet fitting.

d. Hot Water Valve.

(1) *Description.* A manually operated valve installed across the hot water outlet line.

(2) *Purpose.* Controls the flow of hot water from the hot water outlet fitting.

e. Hot Water Return Valve.

(1) *Description.* A manually operated valve installed across the hot water return/hot water tank drain line.

(2) *Purpose.* Controls hot water return and allows draining of hot water tank.

2-4. Auxiliary Power Outputs Controls and Instruments

The auxiliary power output controls are located on the upper left of the instrument panel (fig. 2-3) immediately above the conditioned air controls. They control delivery of power to the 400 Hz receptacles on the receptacle panel. The description and function of the controls and instruments are described below.

a. Auxiliary Power Trip Indicator Lamps (two used: output 1 and output 2).

(1) *Description.* Filament type press-to-test lamps with red lens.

(2) *Purpose.* Illuminate to indicate that the auxiliary power output contactor has tripped to disconnect the output to the receptacle indicated (output 1 or output 2).

NOTE

The press-to-test feature allows operator to test circuit (Bulb). Auxiliary power output No. 1 is checked with unit in operation and main 400HZ contactor closed. The unit does not have to be operating in order to check auxiliary power output No. 2 press-to-test circuit.

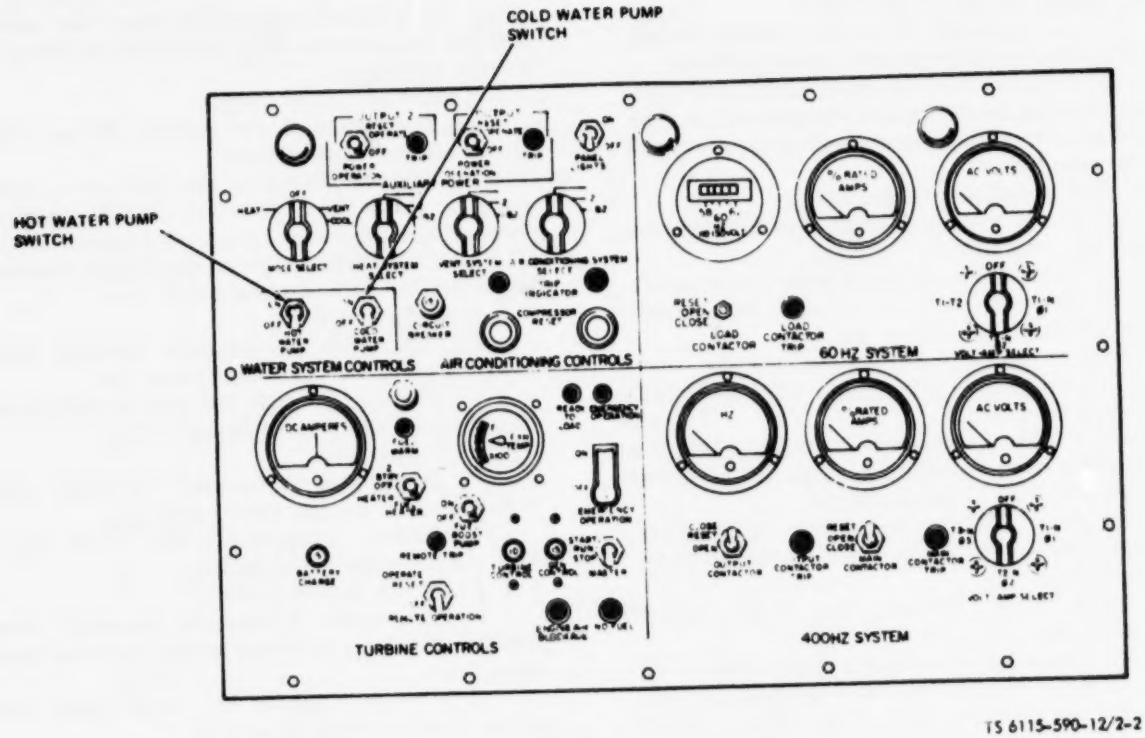


Figure 2-2. Instrument Panel (Water System Controls). (TS 6115-590-12/2-2)

b. Auxiliary Power Switches (two used: output 1 and output 2).

(1) *Description.* A three position toggle switch.

(2) *Purpose.* Energize and de-energize auxiliary power outputs 1 and 2 and prevent operation of one conditioned air system when one auxiliary output is operated or both conditioned air systems when both auxiliary outputs are operated. Also resets the 400 Hz auxiliary output when tripped.

2-5. Conditioned Air System Controls and Instruments

The conditioned air system controls and instruments are located on the upper left of the instrument panel (fig. 2-4), the conditioned air circuit breaker panel (fig. 2-5), and the conditioned air temperature control panel (fig. 2-6). The description and function of the conditioned air system controls and instruments are described as follows:

a. Panel Illumination Lamps (fig. 2-4).

(1) *Description.* The three panel illumination lamps are hooded filament type lamps. The hoods are adjustable for directing the illumination on the panel.

(2) *Purpose.* Illuminates the instrument panel for night operation.

b. Panel Lights Switch.

(1) *Description.* A two position ON-OFF toggle switch.

(2) *Purpose.* Energizes and de-energizes the three panel illumination lamps.

c. Conditioned Air Mode Select Switch.

(1) *Description.* A four position rotary switch.

(2) *Purpose.* Selects the type of conditioned air (heat, vent, cool, or off) as desired to be delivered from the conditioned air system.

d. Heat System Select Switch.

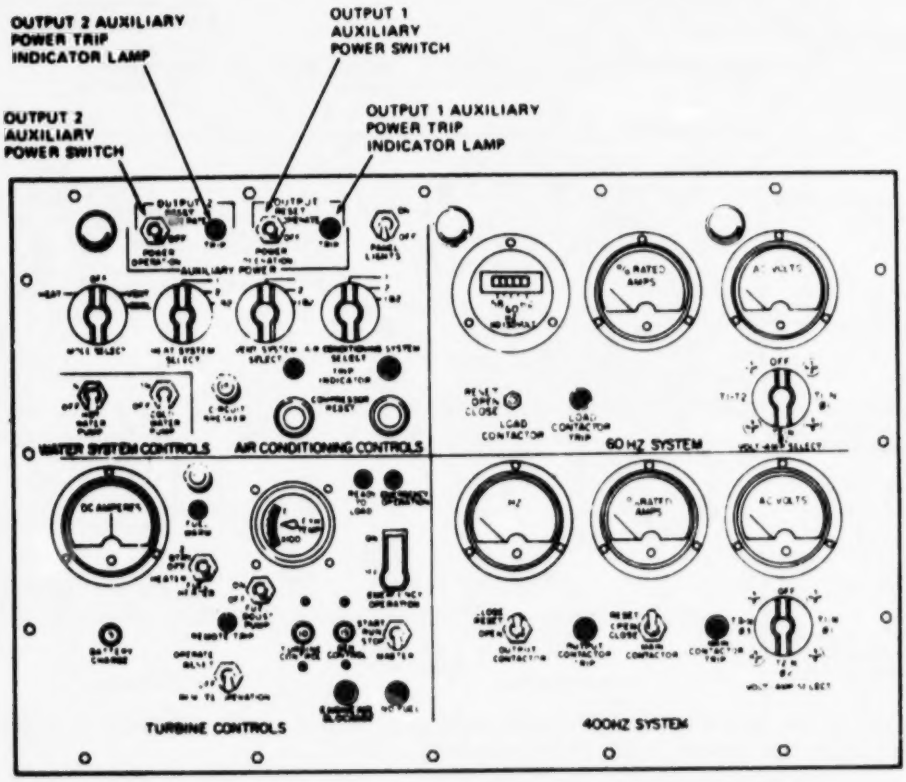
(1) *Description.* A three position rotary switch.

(2) *Purpose.* Selects the No. 1 system, the No. 2 system, or the No. 1 and the No. 2 system combined to deliver heated air as described to meet heated air output requirements.

e. Vent System Select Switch.

(1) *Description.* A three position rotary switch.

(2) *Purpose.* Selects the No. 1 system, the No. 2 system, or the No. 1 and the No. 2 system


OUTPUT 2 AUXILIARY POWER TRIP INDICATOR LAMP
OUTPUT 1 AUXILIARY POWER SWITCH
OUTPUT 2 AUXILIARY POWER SWITCH
OUTPUT 1 AUXILIARY POWER TRIP INDICATOR LAMP
WATER SYSTEM CONTROLS
AIR CONDITIONING CONTROLS
60 HZ SYSTEM
TURBINE CONTROLS
400HZ SYSTEM

TS 6115-590-12/2-3

Figure 2-3. Instrument Panel (Auxiliary Power Outputs Controls). (TS 6115-590-12/2-3)

combined to deliver ventilating air as desired to meet ventilating air output requirement.

f. Air Conditioning System Select Switch.

(1) *Description.* A three position rotary switch.

(2) *Purpose.* Selects the No. 1 system, the No. 2 system, or the No. 1 and the No. 2 system combined to deliver cooled air as desired to meet cooled air output requirements.

g. Conditioned Air System Controls Circuit Breaker.

(1) *Description.* A press-to-reset circuit breaker installed in the conditioned air system control circuit.

(2) *Purpose.* Provides short circuit and overload protection for the conditioned air system controls circuit. The circuit breaker opening amperage (15 amps) is marked on the reset button.

h. No. 1 System Compressor Reset Button.

(1) *Description.* A press-to-reset switch installed in the No. 1 system compressor power circuit.

(2) *Purpose.* Resets the No. 1 system compressor power contactor to CLOSE for delivery of power to the compressor motor.

i. No. 2 System Compressor Reset Button.

(1) *Description.* A press-to-reset switch installed in the No. 2 system compressor power circuit.

(2) *Purpose.* Resets the No. 2 system compressor power contactor to CLOSE for delivery of power to the compressor motor.

j. No. 1 System Compressor Trip Indicator Lamp.

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that the power contactor to the No. 1 system compressor has tripped to open the power circuit to the compressor motor.

k. No. 2 System Compressor Trip Indicator Lamp.

(1) *Description.* A filament type press-to-test lamp with a red lens.

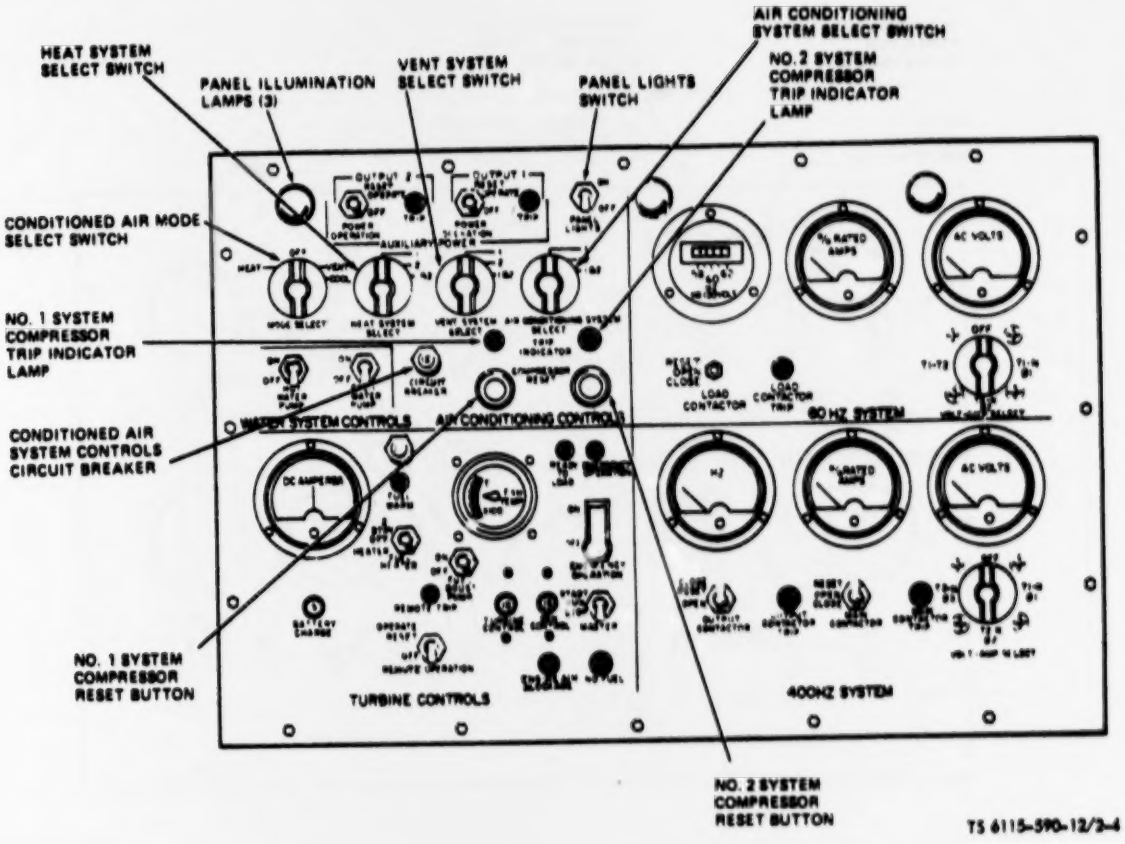

HEAT SYSTEM SELECT SWITCH
PANEL ILLUMINATION LAMPS (3)
VENT SYSTEM SELECT SWITCH
PANEL LIGHTS SWITCH
AIR CONDITIONING SYSTEM SELECT SWITCH
NO. 2 SYSTEM COMPRESSOR TRIP INDICATOR LAMP
CONDITIONED AIR MODE SELECT SWITCH
NO. 1 SYSTEM COMPRESSOR TRIP INDICATOR LAMP
CONDITIONED AIR SYSTEM CONTROLS CIRCUIT BREAKER
NO. 1 SYSTEM COMPRESSOR RESET BUTTON
WATER SYSTEM CONTROLS
AIR CONDITIONING CONTROLS
60 HZ SYSTEM
TURBINE CONTROLS
400HZ SYSTEM
NO. 2 SYSTEM COMPRESSOR RESET BUTTON
TS 6115-590-12/2-4

Figure 2-4. Instrument Panel (Conditioned Air System Controls). (TS 6115-590-12/2-4).

(2) *Purpose.* Illuminates to indicate that the power contactor to the No. 2 system compressor has tripped to open the power circuit to the compressor motor.

NOTE

The press-to-test feature of the air conditioning compressor trip indicators (system 1 and 2) allow operator to check circuit (Bulb). They are to be checked only with the unit in operation and main 400HZ contactor closed.

l. Recirculating Fan Circuit Breaker (No. 1 system) (fig. 2-5).

(1) *Description.* A press-to-reset circuit breaker installed in the No. 1 system recirculating fan power circuit.

(2) *Purpose.* Provides short circuit and overload protection for the No. 1 system recirculating fan power circuit. The circuit breaker opening amperage (20 amps) is marked on the reset button.

m. Condenser Fan Circuit Breaker (No. 1 system).

(1) *Description.* A press-to-reset circuit breaker installed in the No. 1 system condenser fan power circuit.

(2) *Purpose.* Provides short circuit and overload protection for the No. 1 system condenser fan power circuit. The circuit breaker opening amperage (50 amps) is marked on the reset button.

n. Deleted.

o. Recirculating Fan Circuit Breaker (No. 2 system) (fig. 2-5).

(1) *Description.* A press-to-reset circuit breaker installed in the No. 2 system recirculating fan power circuit.

(2) *Purpose.* Provides short circuit and overload protection for the No. 2 system recirculating fan

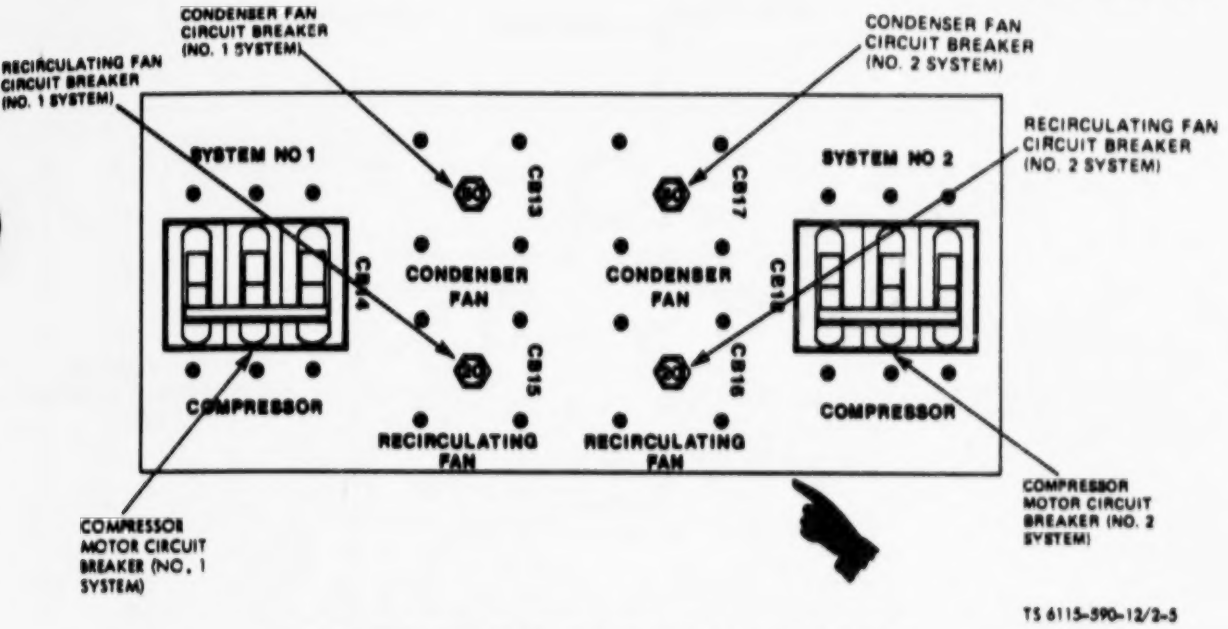


Figure 2-5. Conditioned Air Circuit Breaker Panel. (TS 6115-590-12/2-5).

s. Cooled Air System Indicating Lamp (No. 2 system) (fig. 2-6).

(1) *Description.* A filament type press-to-test lamp with a green lens.

(2) *Purpose.* Illuminates to indicate that the No. 1 cooled air temperature control is calling for cooling.

t. Cooled Air System Indicating Lamp (No. 2 system).

(1) *Description.* A filament type press-to-test lamp with a green lens.

(2) *Purpose.* Illuminates to indicate that the No. 2 cooled air temperature control is calling for cooling.

u. Cooled Air System Temperature (Thermostat) Control (No. 1 system).

(1) *Description.* An electronic thermostat control, connected to the thermister-temperature-sensitive elements in the return air ducts.

(2) *Purpose.* Provides progressive adjustment of the cooled air output temperature from the No. 1 cooled air system. Lowers the output temperature when rotated counterclockwise and raises the output temperature when rotated clockwise.

v. Cooled Air System Temperature (Thermostat) Control (No. 2 system).

(1) *Description.* An electronic thermostat control, connected to the thermister-temperature-sensitive elements in the return air ducts.

(2) *Purpose.* Provides progressive adjustment of the cooled air output temperature from the No. 2 cooled air system. Lowers the output temperature when rotated counterclockwise and raises the output temperature when rotated clockwise.

w. Heat Range Select Switch (No. 1 system).

(1) *Description.* A four position rotary switch.

(2) *Purpose.* Selects one of the three heating ranges (LOW, MED, HIGH) as desired for the No. 1 heated air system. Limits the travel of the heat control valve in the opening direction (25 percent, 50 percent and full open). Provides an OFF position for shutdown of the heated air system.

x. Heat Range Select Switch (No. 2 system).

(1) *Description.* A four position rotary switch.

(2) *Purpose.* Selects one of the three heating ranges (LOW, MED, HIGH) as desired for the No. 2 heated air system. Limits the travel of the heat control valve in the opening direction (25 percent, 50 percent and full open). Provides an OFF position for shutdown of the heated air system.

y. Heated Air System Temperature Control (No. 1 system).

(1) *Description.* An electronic thermostat control, connected to thermistor-temperature-sensitive elements in the return air ducts.

(2) *Purpose.* Provides progressive adjustment of the heated air output temperature within the heating range selected by the heat range select switch, from the No. 1 heated air system. Lowers the output temperature when rotated counterclockwise and raises the output temperature when rotated clockwise.

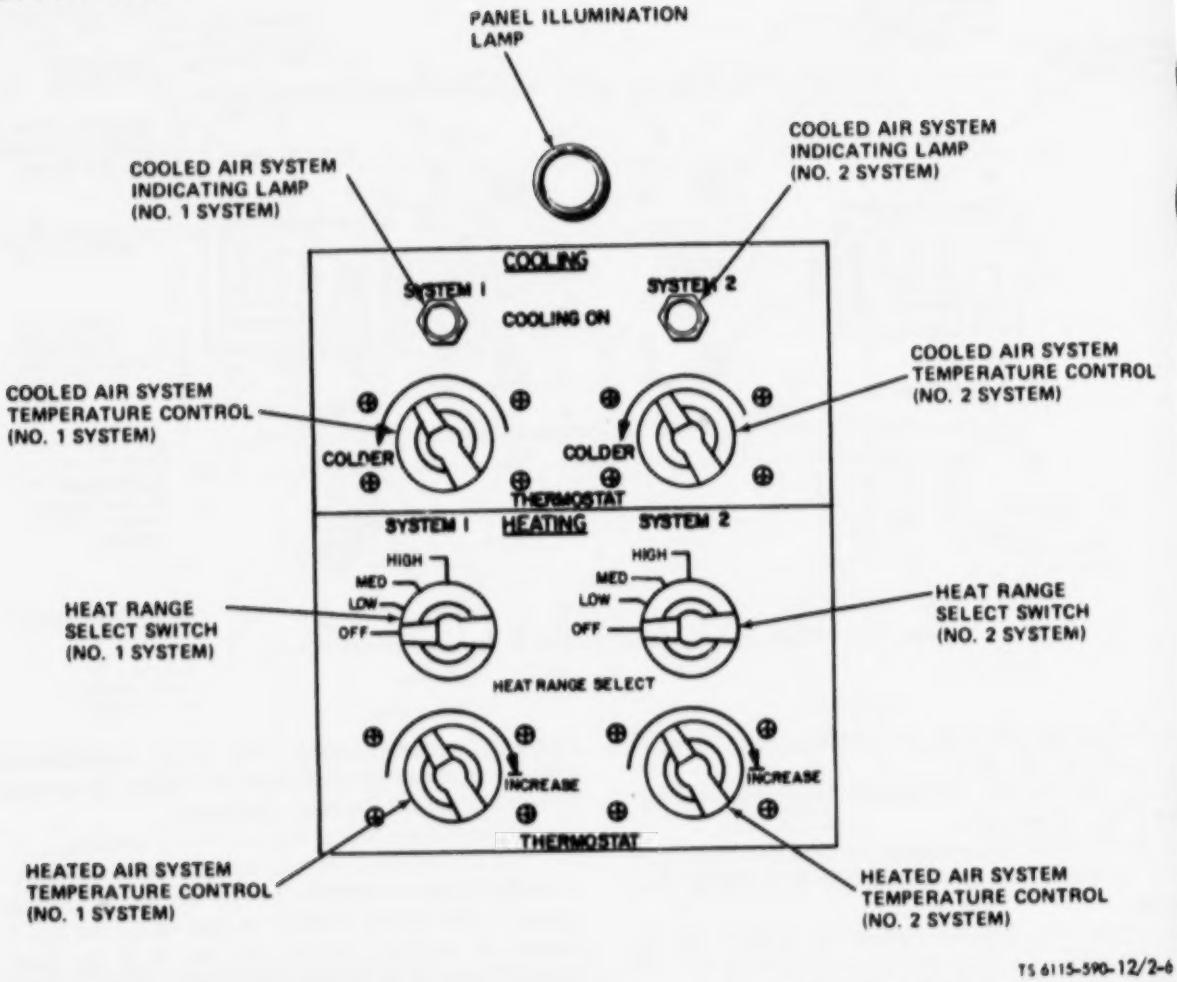


Figure 2-6. Conditioned Air Temperature Control Panel. (TS 6115-590-12/2-6).

z. Heated Air System Temperature Control (No. 2 system).

(1) *Description.* An electronic thermostat control, connected to thermistor-temperature-sensitive elements in the return air ducts.

(2) *Purpose.* Provides progressive adjustment of the heated air output temperature, within the heating range selected by the heat range select switch, from the No. 2 heated air system. Lowers the output temperature when rotated counterclockwise and raises the output temperature when rotated clockwise.

aa. Panel Illumination Lamp.

(1) *Description.* A hooded filament type lamp, adjustable for directing the illumination on the panel.

(2) *Purpose.* Illuminates the conditioned air system temperature control panel for night operations. The lamp is energized by the panel light switch (fig. 2-4).

2-6. 60 Hz Electrical System Controls and Instruments (fig. 2-7)

The 60 Hz electrical system controls and instruments are located on the instrument panel. The description, purpose, and function of the 60 Hz electrical system controls and instruments for the power unit 60 Hz electrical system are described as follows:

a. Frequency Meter.

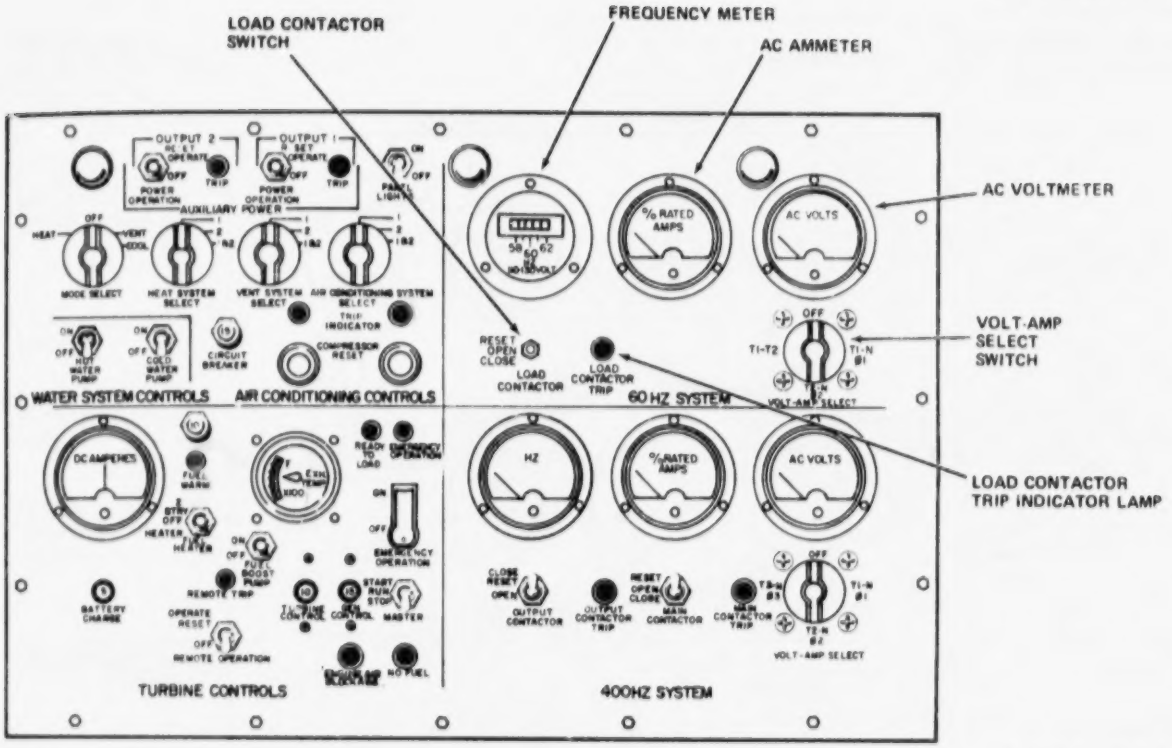
(1) *Description.* A vibrating reed type meter calibrated to indicate 58 to 62 hertz per second in one hertz increments.

(2) *Purpose.* To indicate the output frequency of the 60 Hz electrical system.

(3) *Indication.* Normal indication during operation is 60 Hz per second. No indication is shown when not operating.

b. AC Ammeter.

(1) *Description.* Dial pointer gauge, calibrated to indicate percent of rated current. The dial



TS 6115-590-12/2-7

Figure 2-7. Instrument Panel (60 Hz Electrical). (TS 6115-590-12/2-7).

calibrated from 0 to 125 percent in 5 percent increments. The dial range is colored red from 100 to 125 percent.

(2) *Purpose.* To indicate the line-to-line and line-to-neutral current as selected through the volt-amp select switch during operation of the power unit.

(3) *Indication.* Normal operating range is 0 to 100 percent. Ammeter readings over 100 percent indicate an overload condition.

c. AC Voltmeter.

(1) *Description.* Dial pointer gauge, calibrated to indicate 0 to 300V AC in 10 volt increments.

(2) *Purpose.* Indicates line-to-line and line-to-neutral voltages, as selected through the volt-amp select switch during operation of the power unit.

(3) *Indication.* Normal operating indication is 120 or 240V AC as determined by the position of the volt-amp select switch.

d. Volt-Amp Select Switch.

(1) *Description.* A four position rotary switch.

(2) *Purpose.* Connects the AC ammeter and AC voltmeter for selective monitoring of the line-to-line and two-line-to-neutral voltages and currents. An OFF position is also provided to disconnect the ammeter and voltmeter.

e. Load Contactor Switch.

(1) *Description.* A three position toggle switch.

(2) *Purpose.* In the CLOSE position the switch actuates the 60 Hz power output contactor to close, thus connecting the 60 Hz electrical system to the external load. In the OPEN position the switch actuates the contactor to open and disconnect the load. In the RESET position the switch resets the protective circuits in the generator control panel if the load contactor trip light is on.

f. Load Contactor Trip Indicator Lamp.

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that the load contactor has tripped to disconnect the load from the 60 Hz electrical system.

2-7. 400 Hz Electrical System Controls and Instruments (fig. 2-8)

The 400 Hz electrical system controls and instruments are located on the instrument panel. The description, purpose, and function of the 400 Hz electrical system controls and instruments for the power unit 400 Hz electrical system are described as follows:

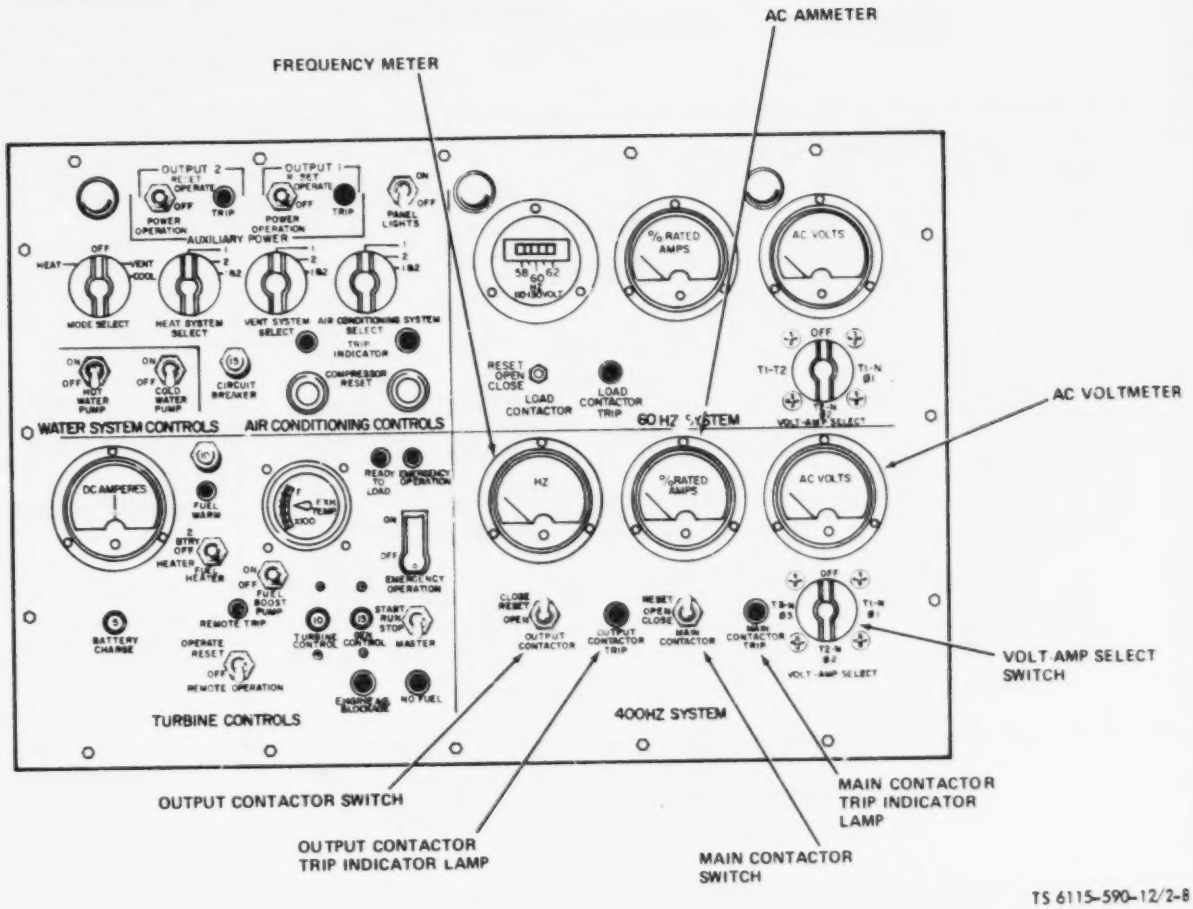


Figure 2-8. Instrument Panel (400 Hz Electrical). (TS 6115-590-12/2-8).

a. Frequency Meter.

(1) *Description.* Dial pointer gauge, calibrated to indicate 388 to 412 hertz per second in 1/2 hertz per second increments. The dial scale has a red index mark at 400 hertz per second.

(2) *Purpose.* To indicate the output frequency of the 400 Hz electrical system.

(3) *Indication.* Normal indication is 400 Hz per second.

b. AC Ammeter.

(1) *Description.* Dial pointer gauge, calibrated to indicate percent of rated current. The dial is calibrated from 0 to 125 percent in 5 percent increments. The dial is colored red from 100 to 125 percent.

(2) *Purpose.* To indicate the line-to-neutral current as selected through the volt-amp select switch during operation of the power unit.

(3) *Indication.* Normal operating range is 0 to 100 percent. Ammeter readings over 100 percent indicate an overload condition.

c. AC Voltmeter.

(1) *Description.* Dial pointer gauge, calibrated to indicate 0 to 150V AC in 5 volt increments.

(2) *Purpose.* Indicates line-to-neutral voltages, as selected through the volt-amp select switch during operation of the power unit.

(3) *Indication.* Normal operating indication is 120V AC, as determined by the position of the volt-amp select switch.

d. Volt-Amp Select Switch.

(1) *Description.* A four position rotary switch.

(2) *Purpose.* Connects the AC ammeter and AC voltmeter for selective monitoring of the line-to-neutral voltages and currents. An OFF position is also provided to disconnect the ammeter and voltmeter.

e. Output Contactor Switch.

(1) *Description.* A three position toggle switch.

(2) *Purpose.* In the momentary RESET position the switch actuates the 400 Hz output contactor to reset and close the output contacts connecting the 400 Hz electrical system to the external load. When released, the switch returns to the CLOSE position. In the OPEN position the switch actuates the contactor to open the output contacts and disconnect

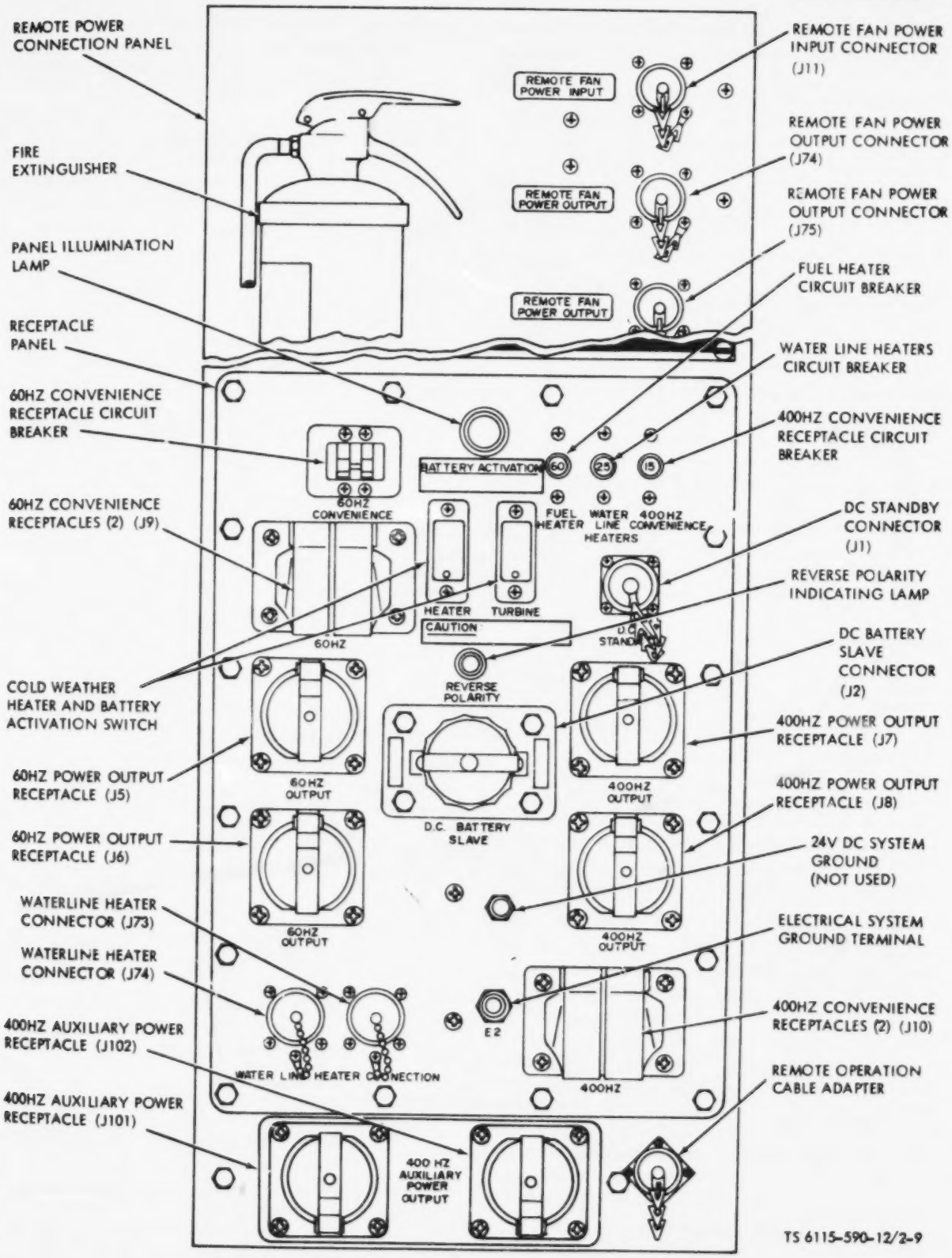


Figure 2-9. Receptacle and Remote Power Panels. (TS 6115-590-12/2-9).

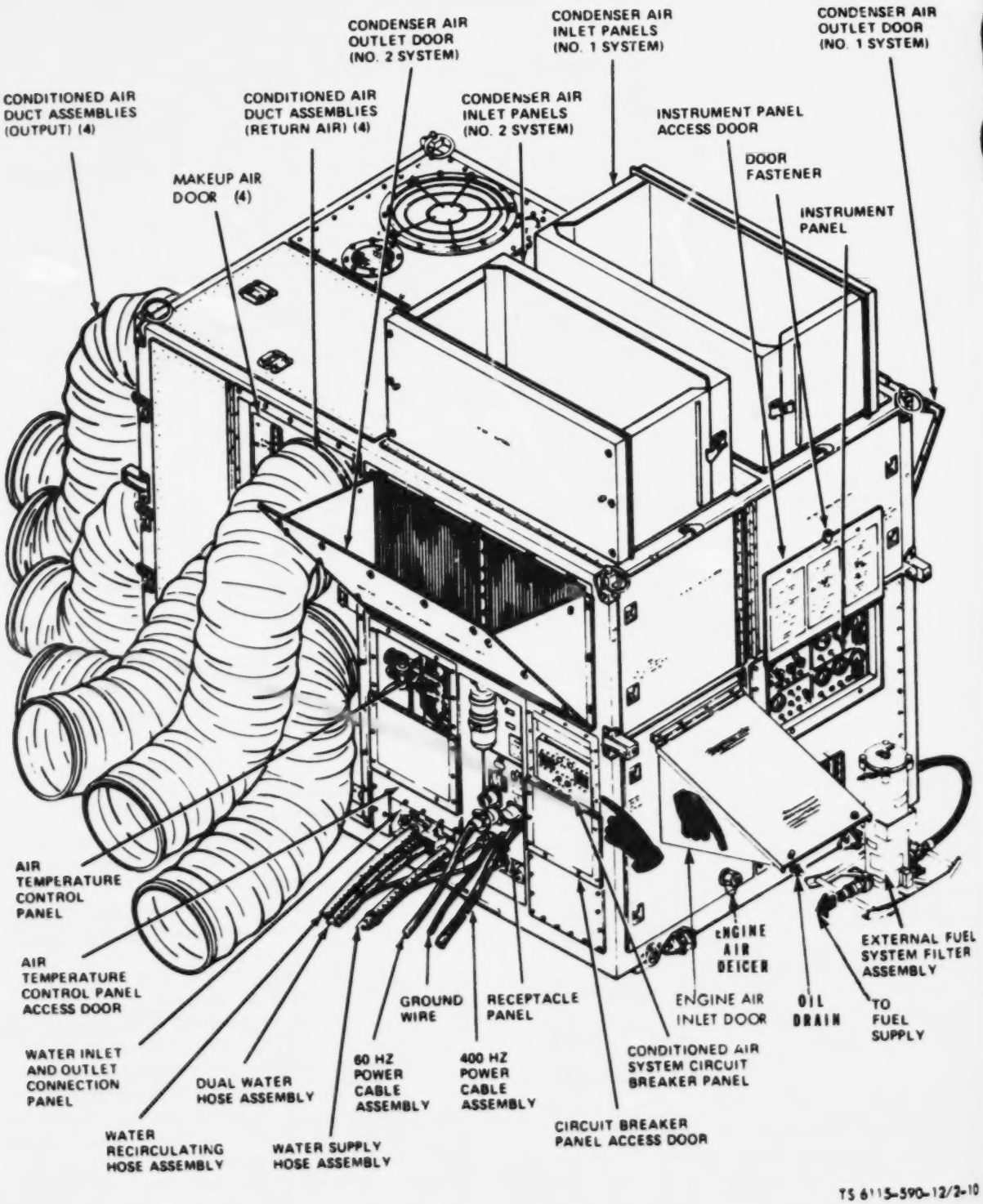

CONDENSER AIR OUTLET DOOR (NO. 2 SYSTEM)
CONDENSER AIR INLET PANELS (NO. 1 SYSTEM)
CONDENSER AIR OUTLET DOOR (NO. 1 SYSTEM)
CONDITIONED AIR DUCT ASSEMBLIES (OUTPUT) (4)
CONDITIONED AIR DUCT ASSEMBLIES (RETURN AIR) (4)
CONDENSER AIR INLET PANELS (NO. 2 SYSTEM)
INSTRUMENT PANEL ACCESS DOOR
DOOR FASTENER
MAKEUP AIR DOOR (4)
INSTRUMENT PANEL
AIR TEMPERATURE CONTROL PANEL
AIR TEMPERATURE CONTROL PANEL ACCESS DOOR
WATER INLET AND OUTLET CONNECTION PANEL
DUAL WATER HOSE ASSEMBLY
WATER RECIRCULATING HOSE ASSEMBLY
WATER SUPPLY HOSE ASSEMBLY
60 HZ POWER CABLE ASSEMBLY
GROUND WIRE
400 HZ POWER CABLE ASSEMBLY
RECEPTACLE PANEL
CIRCUIT BREAKER PANEL ACCESS DOOR
CONDITIONED AIR SYSTEM CIRCUIT BREAKER PANEL
ENGINE AIR INLET DOOR
ENGINE AIR DEICER
OIL DRAIN
EXTERNAL FUEL SYSTEM FILTER ASSEMBLY
TO FUEL SUPPLY
TS 6115-590-12/2-10

Figure 2-10. Power Plant Connected and Opened for Normal Operation. (TS 6115-590-12 2-10)

the external load. The RESET function of the switch is bypassed when the emergency switch is ON.

f. Output Contactor Trip Indicator Lamp.

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that the output contactor has tripped to disconnect the external load from the 400 Hz electrical system.

g. Main Contactor Switch.

(1) *Description.* A three position toggle switch.

(2) *Purpose.* In the CLOSE position, the switch actuates the main contactor to close and connect the external and internal 400 Hz electrical load to the electrical system. In the OPEN position, the switch actuates the main contactor to open and disconnect the external and internal 400 Hz electrical load from the electrical system. In the RESET position the switch resets the protective circuits in the generator control panel if the main contactor trip light is ON.

h. Main Contactor Trip Indicator Lamp.

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that the main contactor has tripped and disconnected all external and internal 400 Hz electrical loads from the electrical system.

2-8. Receptacle Panel Controls

The receptacle panel controls are located at the top of the panel (fig. 2-3). The description, purpose, and function of the receptacle panel controls and described as follows:

a. 60 Hz Convenience Receptacle Circuit Breaker (fig. 2-9).

(1) *Description.* A manual reset type circuit breaker installed in the electrical circuit to the two 60 Hz convenience receptacles.

(2) *Purpose.* Provides short circuit and overload protection to the 60 Hz convenience receptacles circuit. The circuit breaker opening amperage is 15 amps.

b. Panel Illumination Lamp (fig. 2-9).

(1) *Description.* A hooded filament type lamp adjustable for directing the illumination on the panel.

(2) *Purpose.* Illuminates the electrical output connection panel for night operations. The lamp is energized by the panel lights switch (fig. 2-4).

c. Fuel Heater Circuit Breaker (fig. 2-9).

(1) *Description.* A press-to-reset type circuit breaker installed in a fuel heater electrical circuit (used with winterized units only).

(2) *Purpose.* Provides short circuit and overload protection for a fuel heater electrical circuit (used with winterized units only). The circuit breaker opening amperage (60 amps) is marked on the reset button.

d. Water Line Heaters Circuit Breaker (fig. 2-9).

(1) *Description.* A press-to-reset type circuit breaker installed in the water line heaters circuit.

(2) *Purpose.* Provides short circuit and overload protection for the water line heaters circuit. The circuit breaker opening amperage (25 amps) is marked on the reset button.

e. 400 Hz Convenience Receptacle Circuit Breaker.

(1) *Description.* A press-to-reset type circuit breaker installed in the electrical circuit to the two 400 Hz convenience receptacles.

(2) *Purpose.* Provides short circuit and overload protection to the 400 Hz convenience receptacle circuit. The circuit breaker opening amperage (15 amps) is marked on the reset button.

f. Reverse Polarity Indicating Lamp.

(1) *Description.* A filament type bulb with a red lens.

(2) *Purpose.* Illuminates to indicate that an external 24V DC power source has been connected to the external DC power source connector with the polarity reversed in comparison with the power unit DC circuits.

g. Cold Weather Heaters and Battery Activation Switches.

Use only with units with winterization kit installed.

h. Remote Operation Cable Adapter.

(1) *Description.* An adapter with a male and female side.

(2) *Purpose.* Used for connecting two standby cables together to gain added length when required. The adapter is carried on this panel but is not connected to any circuit. It is to be removed from the receptacle panel for use.

2-9. Operation Under Normal Conditions

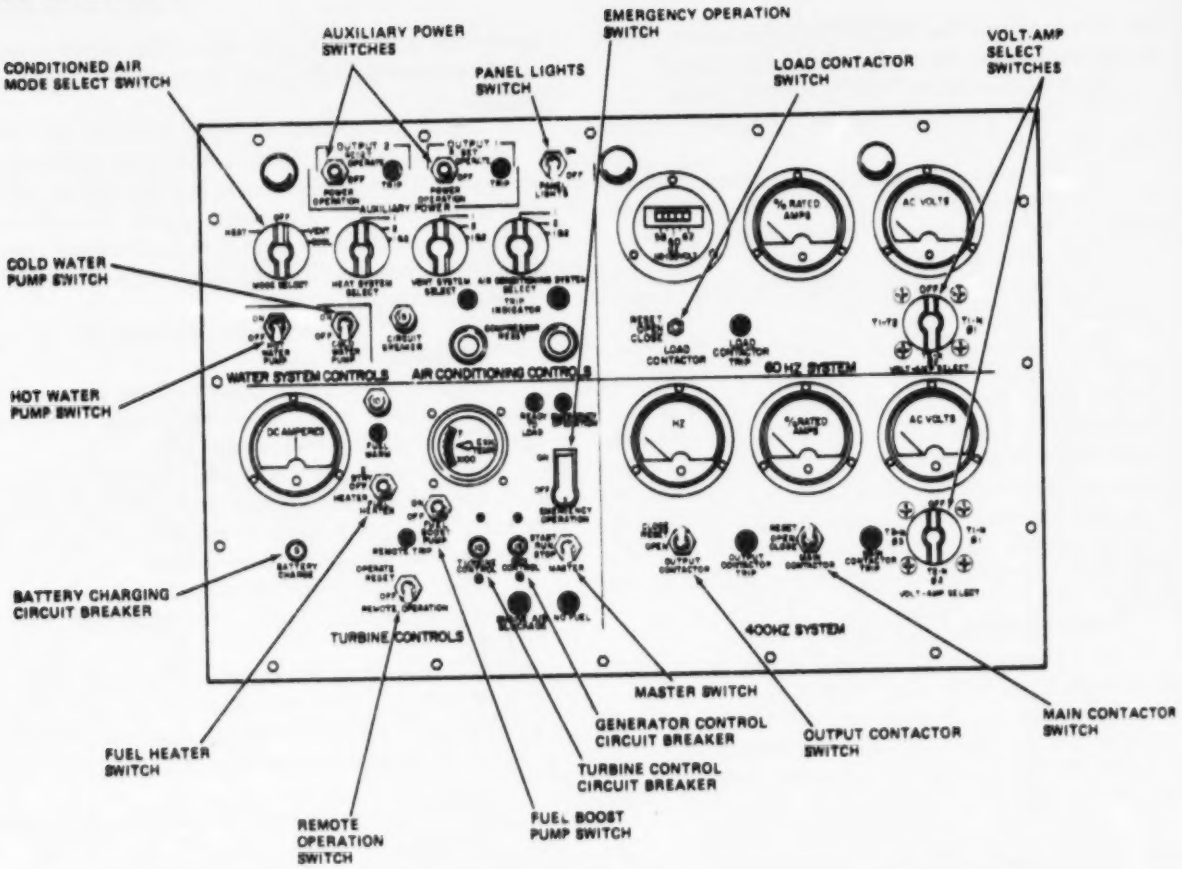
a. The following instructions are published for the information and guidance of personnel responsible for operation of the power plant.

b. The operator must know how to perform every operation of which the power plant is capable. Instructions are given for starting and stopping the power plant, operation of the power plant, and for coordinating the basic motions to perform the specific tasks for which the equipment is designed. Since nearly every job presents a different problem, the operator may have to vary given procedures to fit the individual job.

2-10. Starting the Power Plant

a. Preparation for Starting.

(1) If the power plant is to be operated for the



NOTE: ENGINE WILL NOT START IF ENGINE AIR INLET DOOR IS CLOSED OR IF MAIN CONTACTOR SWITCH AND LOAD CONTACTOR SWITCH ARE NOT IN THE OPEN POSITION.

NOTE: IF LIGHT CONDITION REQUIRES ILLUMINATION OF INSTRUMENT PANEL, PLACE PANEL LIGHTS SWITCH IN ON POSITION.

STEP 1. PLACE THE FOLLOWING SWITCHES IN THE OFF OR OPEN POSITION: CONDITIONED AIR MODE SELECT SWITCH, HOT WATER PUMP SWITCH, COLD WATER PUMP SWITCH, AUXILIARY POWER SWITCHES, LOAD CONTACTOR SWITCH, VOLT-AMP SELECT SWITCHES, MAIN CONTACTOR SWITCH, OUTPUT CONTACTOR SWITCH, REMOTE OPERATION SWITCH, FUEL BOOST PUMP SWITCH, AND FUEL HEATER SWITCH.

STEP 2. CHECK THAT THE EMERGENCY OPERATION SWITCH IS IN THE OFF POSITION AND THAT THE LOCKOUT COVER IS IN PLACE. CHECK THAT MASTER SWITCH IS IN STOP POSITION.

STEP 3. PRESS IN RESET BUTTONS FOR BATTERY CHARGING CIRCUIT BREAKER, TURBINE CONTROL CIRCUIT BREAKER, AND GENERATOR CONTROL CIRCUIT BREAKER.

TS 6115-590-12/2-11 ①

Figure 2-11. Starting the Power Plant (Sheet 1 of 2). (TS 6115-590-12/2-11[1]).

first time since receipt, check that the inspection and servicing procedures in paragraph 4-1 have been performed.

(2) Check that installation instructions described in paragraph 4-2 have been accomplished.

WARNING

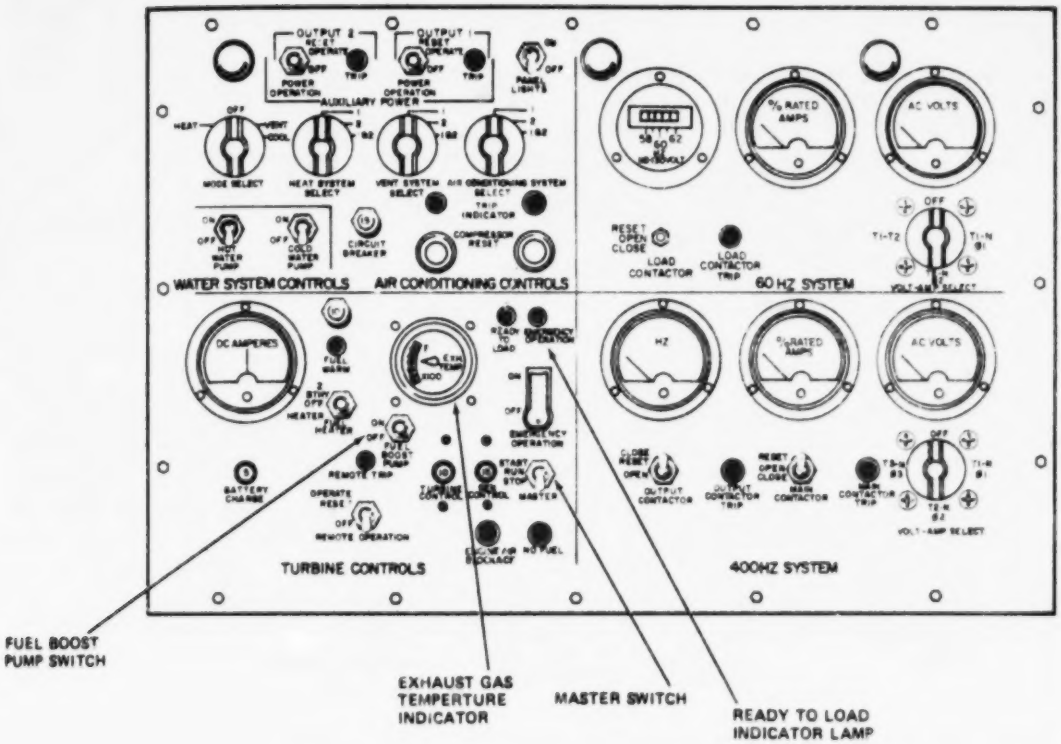
Do not start the power plant until a suitable ground connection has been made in accordance with paragraph 4-2b (1). Failure to observe this warning can result in injury or death to personnel from electrocution.

(3) Perform daily inspection and service procedures as described in paragraph 3-3.

(4) Make sure that an adequate supply of the correct fuel is available for the anticipated operating period.

NOTE

For initial operation or at any time the no fuel indicator lamp is illuminated, it will be necessary to purge air from the fuel float tank to allow the fuel level to overcome the fuel float switch before the unit will start. After connecting the external fuel source hold the fuel boost pump switch ON for a few seconds to fill the fuel tank then open the oil tank access door and press the button on the fuel float tank valve until fuel flows from the drain tube at the oil tank spill drain (Beneath the oil tank fill); then release button. The no fuel indicator lamp should now be extinguished and the power plant can be started by normal procedure.



STEP 4. PLACE FUEL BOOST PUMP SWITCH IN ON POSITION AND MASTER SWITCH IN RUN POSITION.

STEP 5. MOMENTARILY PLACE MASTER SWITCH IN START POSITION, THEN RELEASE MASTER SWITCH TO RUN POSITION. ENGINE WILL AUTOMATICALLY START AND ACCELERATE TO GOVERNED SPEED. FUEL BOOST PUMP WILL CONTINUE TO OPERATE BUT SWITCH WILL DROP TO OFF POSITION.

CAUTION: DO NOT EXCEED STARTER MOTOR DUTY CYCLE OF ONE MINUTE ON AND FOUR MINUTES OFF OR FIVE STARTS IN TEN MINUTES. A ONE MINUTE TIME DELAY RELAY (K4) WILL LIMIT STARTER OPERATION.

STEP 6. LISTEN FOR ENGINE COMBUSTION (CHARACTERISTIC ROAR) AND OBSERVE EXHAUST GAS TEMPERATURE INDICATOR FOR TEMPERATURE INCREASE. OBSERVE THAT READY TO LOAD INDICATOR LAMP ILLUMINATES WITHIN 60 SECONDS INDICATING THAT ENGINE HAS ACCELERATED TO GOVERNED SPEED AND IS READY FOR APPLICATION OF LOAD.

CAUTION: IMMEDIATELY PLACE MASTER SWITCH IN STOP POSITION TO SHUT DOWN ENGINE OPERATION IF COMBUSTION DOES NOT OCCUR, IF EXHAUST GAS TEMPERATURE EXCEEDS 1300 F (704 C) DURING ACCELERATION, IF READY TO LOAD INDICATOR LAMP DOES NOT ILLUMINATE WITHIN 60 SECONDS, OR IF UNUSUAL NOISE OR OBVIOUS MALFUNCTION OCCURS, REPORT MALFUNCTIONS TO ORGANIZATIONAL MAINTENANCE PERSONNEL.

NOTE: WHEN PRACTICABLE, THE ENGINE SHOULD BE OPERATED FOR A TWO TO FIVE MINUTE WARMUP PERIOD BEFORE APPLYING LOAD TO REDUCE THERMAL STRESSES OF THE TURBINE WHELL AND PROLONG ENGINE LIFE.

TS 6115-590-12/2-11 (2)

Figure 2-11. Starting the Power Plant (Sheet 2 of 2). (TS 6115-590-12/2-11[2]).

(5) If water service is to be used, make sure that an adequate supply is available and that the water system has been properly connected and primed in accordance with paragraph 4-2b(5).

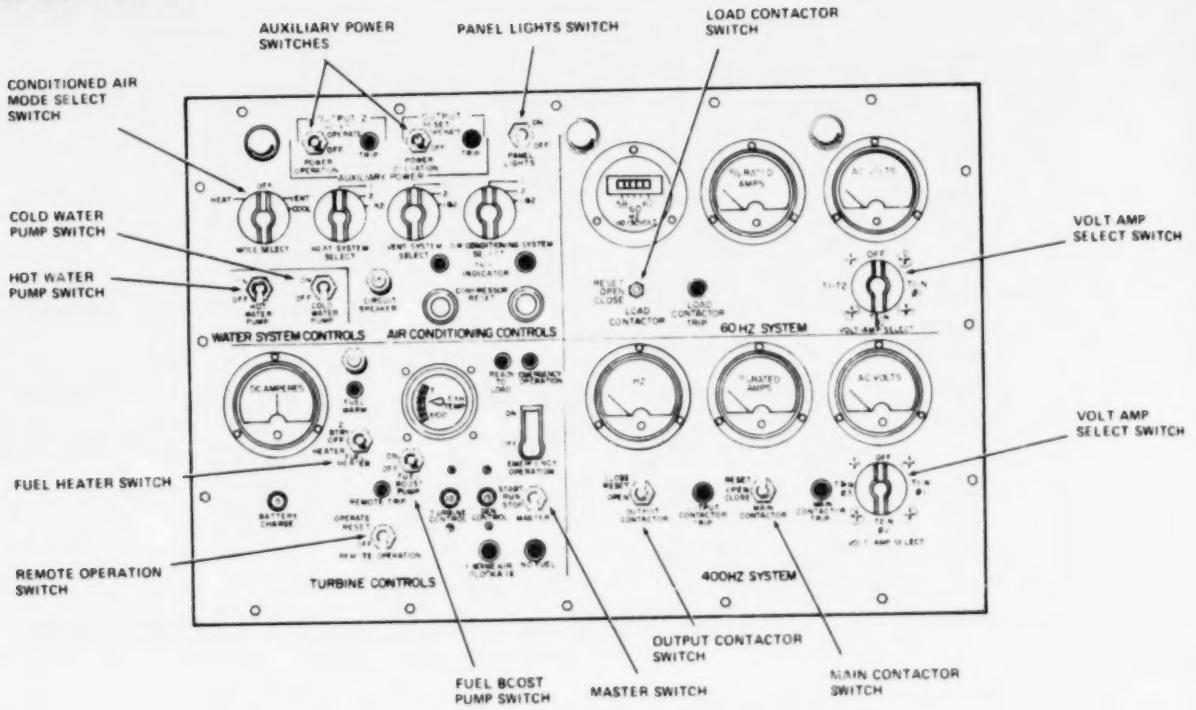
(6) If conditioned air system is to be operated, open condenser air inlet panels and condenser air outlet doors. Make sure panels and doors are secured in the open position (fig. 2-10).

NOTE

Access to top of power plant for opening the condenser air inlet panels is provided by four folding steps on the right rear corner of the enclosure.

(7) Open the engine air inlet door and secure in open position as shown in figure 2-10.

(8) Open instrument panel access door and secure in up position with the door fastener (see fig. 2-10).



STEP 1.	PLACE THE FOLLOWING SWITCHES IN THE OFF OR OPEN POSITION: CONDITIONED AIR MODE SELECT SWITCH, HOT WATER PUMP SWITCH, COLD WATER PUMP SWITCH, AUXILIARY POWER SWITCHES, LOAD CONTACTOR SWITCH, VOLT AMP SELECT SWITCHES, MAIN CONTACTOR SWITCH, OUTPUT CONTACTOR SWITCH, REMOTE OPERATION SWITCH, FUEL HEATER SWITCH, AND PANEL LIGHTS SWITCH.
NOTE:	WHEN PRACTICABLE, THE ENGINE SHOULD BE OPERATED FOR A TWO TO FIVE MINUTE PERIOD AT NO LOAD PRIOR TO STOPPING TO REDUCE THERMAL STRESSES ON THE ENGINE TURBINE WHEEL AND PROLONG ENGINE LIFE.
STEP 2.	PLACE MASTER SWITCH IN STOP POSITION AND ALLOW ENGINE TO COME TO A COMPLETE STOP.

TS 6115-590-12/2-12

Figure 2-12. Stopping the Power Plant. (TS 6115-590-12/2-12).

(9) Open the circuit breaker panel access door and the air temperature control panel access door (see fig. 2-10).

(10) Check all doors and panels not specifically opened in the preceding steps to insure that they are closed and securely fastened.

(11) Open the fuel shutoff valves.

b. Starting. Refer to fig. 2-11 and start the power plant.

WARNING

Operators working in the area of equipment generating high frequency noises, especially if such equipment is operating in a confined area, will be required to wear ear plugs, supplemented by ear protectors. See your safety or medical officer for examination requirements and national stock number for ear plugs and ear protectors. All personnel within a perimeter of 20 feet back from operator's position and five feet from the sides and rear of the power plant are required to wear ear protectors.

2-11. Stopping the Power Plant

a. Preparation for Stopping.

(1) If water system is being used, close hot and cold water valves on water inlet and outlet connection panel (see fig. 4-4).

(2) Operate power plant on heat mode until the conditioned air outlet compartment is completely dry.

(3) If possible, shut off any external equipment powered by 60 Hz and 400 Hz electrical systems.

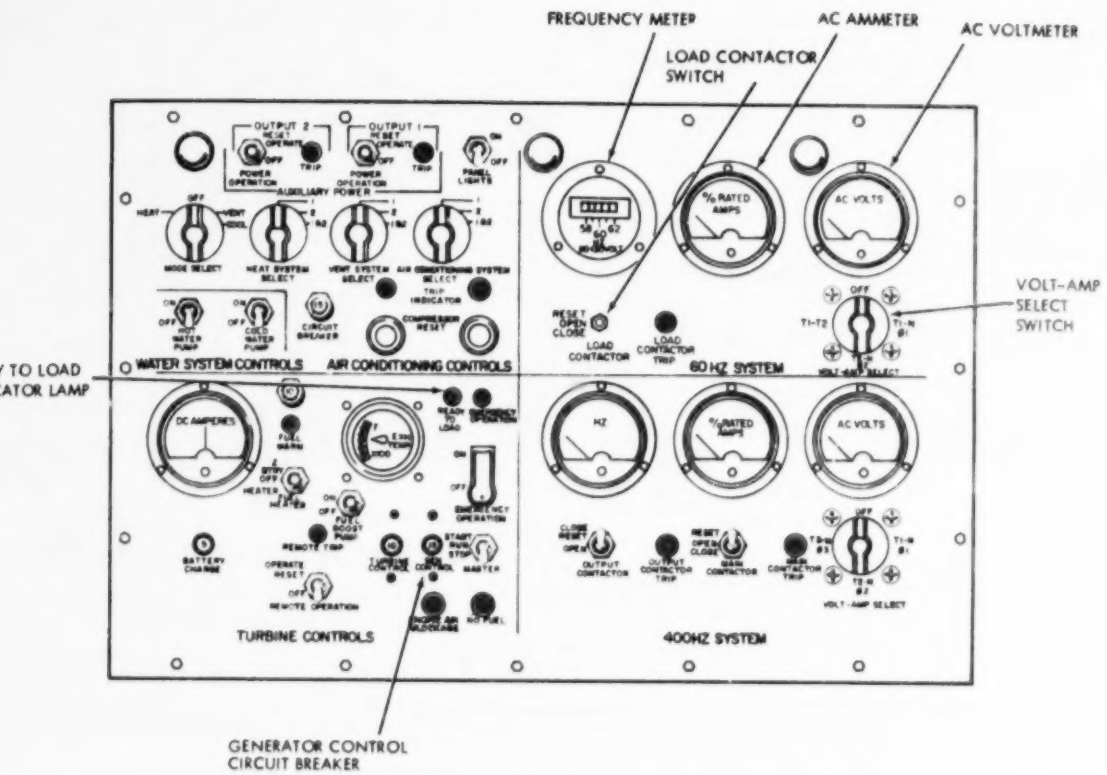
b. Stopping. Refer to fig. 2-12 and stop the power plant.

c. After Operation Procedures. Unless power plant shutdown is only temporary, the following procedures should be performed after stopping.

(1) Shut off water supply to the power plant.

(2) Shut off fuel supply to the power plant.

(3) Close and secure condenser air inlet panels, condenser air outlet doors, engine inlet door, air temperature control panel access door, conditioned air system circuit breaker panel access door, and instrument panel access door.



WARNING: IN CASE OF ACCIDENT FROM ELECTRICAL SHOCK, SHUT DOWN POWER UNIT AT ONCE. IF POWER UNIT CANNOT BE SHUT DOWN, FREE VICTIM FROM LIVE CONDUCTOR WITH A BOARD OR ANY NONCONDUCTOR. IF VICTIM IS UNCONSCIOUS, APPLY ARTIFICIAL RESPIRATION AND OBTAIN MEDICAL HELP.

STEP 1. REFER TO FIGURE 2-10. CHECK THAT 60HZ ELECTRICAL POWER OUTPUT CABLE ASSEMBLY IS SECURELY CONNECTED TO THE ELECTRICAL OUTPUT RECEPTACLE AND TO THE POINT OF USE.

STEP 2. CHECK THAT READY TO LOAD INDICATOR LAMP IS ILLUMINATED INDICATING THAT ENGINE IS READY FOR LOAD.

STEP 3. CHECK THAT RESET BUTTON ON GENERATOR CONTROL CIRCUIT BREAKER IS PUSHED IN.

STEP 4. PLACE VOLT-AMP SELECT SWITCH TO T1-N, OR T1-T2 POSITION.

STEP 5. PLACE MAIN CONTACTOR IN CLOSE POSITION THEN LOAD CONTACTOR SWITCH IN CLOSE POSITION. OBSERVE AC VOLTMETER FOR VOLTAGE READING. IF NO VOLTAGE IS INDICATED, MOMENTARILY PLACE LOAD CONTACTOR SWITCH IN RESET POSITION AND THEN BACK TO CLOSE POSITION.

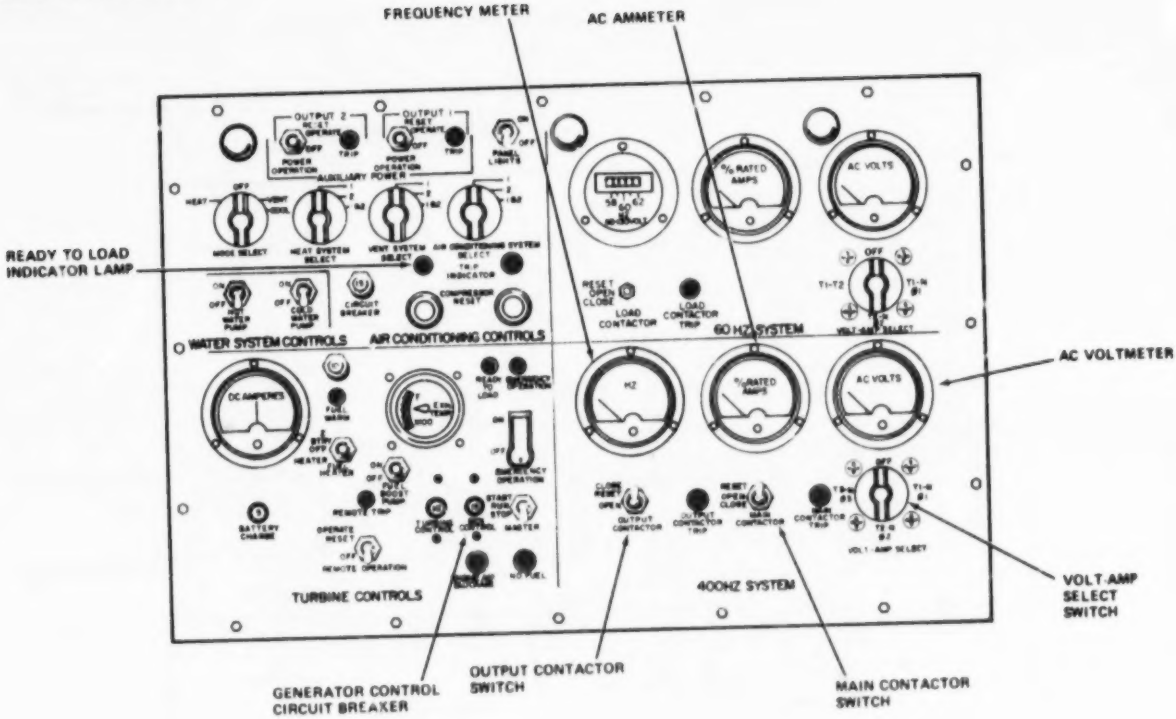
STEP 6. OBSERVE THAT FREQUENCY INDICATED ON FREQUENCY METER IS 60HZ PER SECOND. VOLTAGE AND AMPERAGE OUTPUT MAY BE MONITORED BY POSITIONING VOLT-AMP SELECT SWITCH TO APPROPRIATE PHASE AND OBSERVING AC AMMETER AND AC VOLTMETER.

CAUTION: PLACE LOAD CONTACTOR SWITCH IN OPEN POSITION IF 60HZ ELECTRICAL OUTPUT IS UNATTAINABLE OR ANY OTHER OBVIOUS ELECTRICAL MALFUNCTION OCCURS. REPORT MALFUNCTION TO ORGANIZATIONAL MAINTENANCE PERSONNEL.

NOTE: IF 60HZ POWER IS REQUIRED AT THE 60HZ CONVENIENCE RECEPTACLES ON THE ELECTRICAL OUTPUT CONNECTION PANEL, PRESS RESET BAR ON 60HZ CONVENIENCE RECEPTACLES CIRCUIT BREAKER INTO CONNECT CIRCUIT.

TS 6115-590-12/2-13

Figure 2-13. Operation to Deliver 60 Hz Electrical Power. (TS 6115-590-12/2-13).



WARNING:	IN CASE OF ACCIDENT FROM ELECTRIC SHOCK, SHUT DOWN POWER UNIT AT ONCE. IF POWER UNIT CANNOT BE SHUT DOWN, FREE VICTIM FROM LIVE CONDUCTOR WITH A BOARD OR ANY NONCONDUCTOR. IF VICTIM IS UNCONSCIOUS, APPLY ARTIFICIAL RESPIRATION AND OBTAIN MEDICAL HELP.
STEP 1.	REFER TO FIGURE 2-10. CHECK THAT 400 HZ ELECTRICAL POWER OUTPUT CABLE ASSEMBLY IS SECURELY CONNECTED TO THE ELECTRICAL OUTPUT RECEPTACLE AND TO THE POINT OF USE.
STEP 2.	CHECK THAT READY TO LOAD INDICATOR LAMP IS ILLUMINATED INDICATING THAT ENGINE IS READY FOR LOAD.
STEP 3.	CHECK THAT RESET BUTTON ON GENERATOR CONTROL CIRCUIT BREAKER IS PUSHED IN.
STEP 4.	PLACE VOLT-AMP SELECT SWITCH TO T1-N, T2-N, OR T3-N POSITION.
STEP 5.	MOVE MAIN CONTACTOR SWITCH MOMENTARILY TO RESET POSITION THEN TO CLOSE POSITION. MOMENTARILY MOVE OUTPUT CONTACTOR SWITCH TO CLOSE RESET POSITION THEN RELEASE.
STEP 6.	OBSERVE THAT FREQUENCY INDICATED ON FREQUENCY METER IS 400 $\pm$ 12 HZ PER SECOND. VOLTAGE AND AMPERAGE OUTPUT MAY BE MONITORED BY POSITIONING VOLT-AMP SELECT SWITCH TO APPROPRIATE PHASE AND OBSERVING AC AMMETER AND AC VOLTMETER.
CAUTION:	PLACE MAIN CONTACTOR SWITCH IN OPEN POSITION IF 400 HZ ELECTRICAL OUTPUT IS UNATTAINABLE OR ANY OTHER OBVIOUS ELECTRICAL MALFUNCTION OCCURS. REPORT MALFUNCTION TO ORGANIZATIONAL MAINTENANCE PERSONNEL.
NOTE:	IF 400 HZ POWER IS REQUIRED AT THE 400 HZ CONVENIENCE RECEPTACLES ON THE ELECTRICAL OUTPUT CONNECTION PANEL, PRESS RESET BUTTON ON 400 HZ CONVENIENCE RECEPTACLE CIRCUIT BREAKER IN TO CONNECT CIRCUIT.

TS 6115-590-12/2-14

Figure 2-14. Operation to Deliver 400 Hz Electrical Power. (TS 6115-590-12/2-14).

(4) After power plant has cooled, carefully unroll tarpaulin cover and cover the power plant. Secure all tiedown straps.

2-12. Operation of Equipment

a. Operation to Deliver 60 Hz Electrical Power. Refer to fig. 2-13 for operation of the 60 Hz electrical system.

b. Operation to Deliver 400 Hz Electrical Power. Refer to fig. 2-14 for operation of the 400 Hz electrical system.

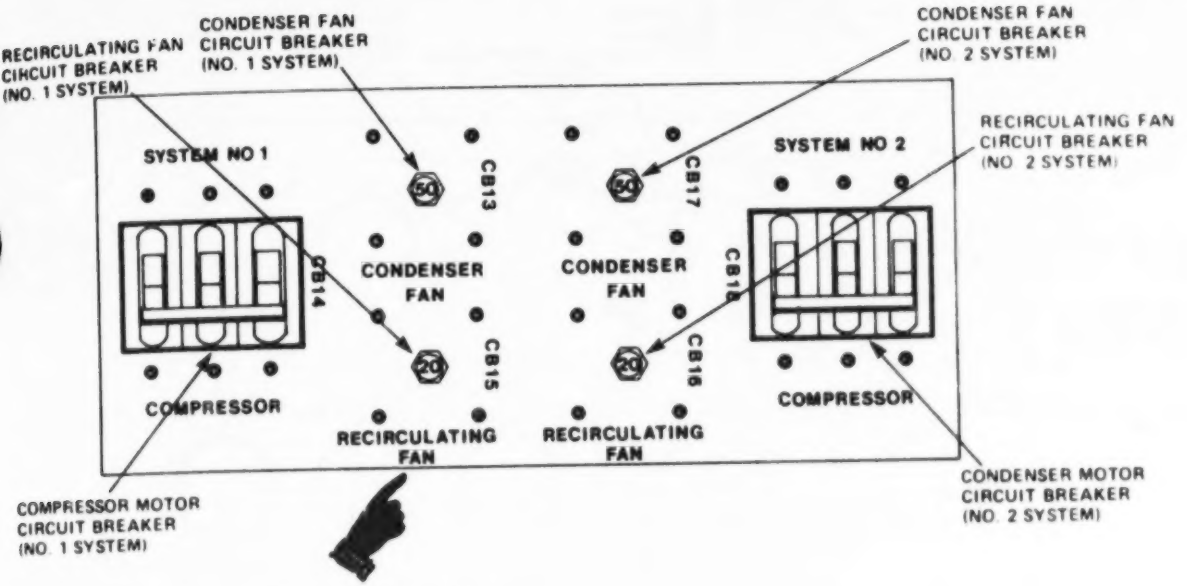
c. Operation to Deliver Cooled Air. Refer to fig. 2-15 for operation of the cooled air system.

NOTE

Make up air doors (fig. 2-10) should be opened as required during operation of the cooled air system to permit intake of make up air to the system.

CAUTION

Condenser air inlet panels and condenser air outlet doors (fig. 2-10) must be open before operating the cooled air system.



CONDITIONED AIR SYSTEM CIRCUIT BREAKER PANEL

CAUTION: CONDENSER AIR INLET PANELS AND CONDENSER AIR OUTLET DOORS MUST BE OPEN BEFORE OPERATING THE COOLED AIR SYSTEM.

STEP 1. REFER TO FIGURE 2-10. CHECK THAT CONDITIONED AIR DUCT ASSEMBLIES ARE CONNECTED TO THE POWER UNIT RETURN AIR INLETS, TO THE AIR OUTLETS, AND TO THE POINT OF USE.

STEP 2. REFER TO FIGURE 2-10. PRESS ALL RESET BUTTONS ON CONDITIONED AIR SYSTEM CIRCUIT BREAKER PANEL TO THE RESET POSITION.

TS 6115-590-12/2-15 ①

Figure 2-15. Operation to Deliver Cooled Air (Sheet 1 of 3). (TS 6115-590-12/2-15).

d. Operation to Deliver Heated Air. Refer to fig. 2-16 for operation of the heated air system.

NOTE

Make up air doors (fig. 2-10) should be opened as required during operation of the ventilating air system to permit intake of make up air to the system.

e. Operation to Deliver Ventilating Air. Refer to fig. 2-17 for operation of ventilating air system.

NOTE

Make up air doors (fig. 2-10) shall be opened as required during operation of the ventilating air system to permit intake of make up air to the system.

f. Operation to Deliver Compressed Air. Refer to fig. 2-18 for operation of compressed air system.

g. Operation to Deliver Hot and Cold Water. Refer to fig. 2-19 for operation of hot and cold water system.

NOTE

Water system shall have been primed and connected as described in Paragraph 4-2b(5) prior to attempting water delivery.

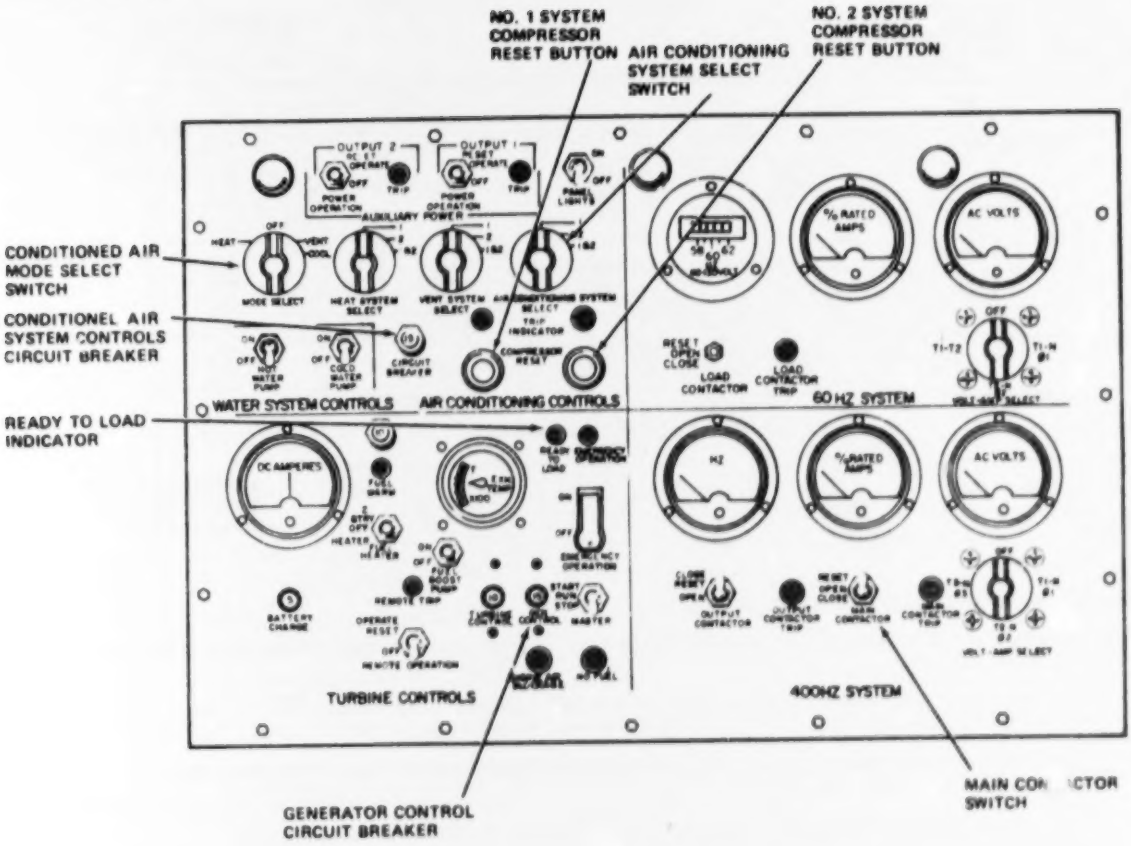
h. Operation to Provide Vacuum. Refer to fig. 2-20 for operation of the vacuum system.

WARNING

The emergency operation switch should be used only in extreme emergencies when need for continued operation justifies risks incurred in loss of equipment and possible injury to personnel.

i. Emergency Operation. If the protective devices in the power plant shut down engine or generator operation for any reason other than engine overspeeding, the protective devices can be bypassed and operation of the power plant continued on an emergency basis. When such operation is imperative, open the lockout cover over the emergency operation switch (fig. 2-11) and place switch in ON position. When emergency operation is no longer required, place the switch in OFF position and correct condition that caused actuation of the protective devices before continuing operation.

j. Remote Operation to Deliver Ventilating Air. When ventilating air is the only requirement from a power plant, the necessary 400 Hz electrical power for operating the recirculating fans may be taken from another operating power plant. A total of two power plant ventilating air systems may be operated by 400 Hz power from one operating power plant. If


NO. 1 SYSTEM COMPRESSOR RESET BUTTON
AIR CONDITIONING SYSTEM SELECT SWITCH
NO. 2 SYSTEM COMPRESSOR RESET BUTTON
CONDITIONED AIR MODE SELECT SWITCH
CONDITIONEL AIR SYSTEM CONTROLS CIRCUIT BREAKER
READY TO LOAD INDICATOR
WATER SYSTEM CONTROLS
AIR CONDITIONING CONTROLS
60 HZ SYSTEM
TURBINE CONTROLS
400HZ SYSTEM
GENERATOR CONTROL CIRCUIT BREAKER
MAIN CONTACTOR SWITCH

STEP 3. CHECK THAT READY TO LOAD INDICATOR LAMP IS ILLUMINATED INDICATING THAT ENGINE IS READY FOR LOAD.

STEP 4. CHECK THAT GENERATOR CONTROL CIRCUIT BREAKER IS PRESSED IN TO THE RESET POSITION.

STEP 5. MOMENTARILY PLACE MAIN CONTACTOR SWITCH IN RESET POSITION THEN PLACE SWITCH IN CLOSE POSITION.

STEP 6. PLACE AIR CONDITIONING SYSTEM SELECT SWITCH IN POSITION FOR THE SYSTEM TO BE OPERATED: SYSTEM 1 SYSTEM 2 OR SYSTEMS 1 & 2 TOGETHER.

STEP 7. PRESS RESET BUTTON ON CONDITIONED AIR SYSTEM CONTROLS CIRCUIT BREAKER IN TO RESET POSITION.

STEP 8. PRESS APPLICABLE SYSTEM OR BOTH COMPRESSOR RESET BUTTONS IN TO RESET POSITION IF TRIP INDICATOR LAMP IS ILLUMINATED.

STEP 9. PLACE CONDITIONED AIR MODE SELECTOR SWITCH TO COOL POSITION. REFER TO STEPS 10 AND 11, FIGURE 2-15, SHEET 3 OF 3, FOR TEMPERATURE ADJUSTMENT.

CAUTION: PLACE MAIN CONTACTOR SWITCH IN OPEN POSITION AND CONDITIONED AIR MODE SELECT SWITCH IN OFF POSITION IF COOLED AIR SYSTEM FAILS TO OPERATE OR ANY OTHER OBVIOUS MALFUNCTION OCCURS. REPORT MALFUNCTION TO ORGANIZATIONAL MAINTENANCE PERSONNEL.

TS 6115-590-12/2-15 (2)

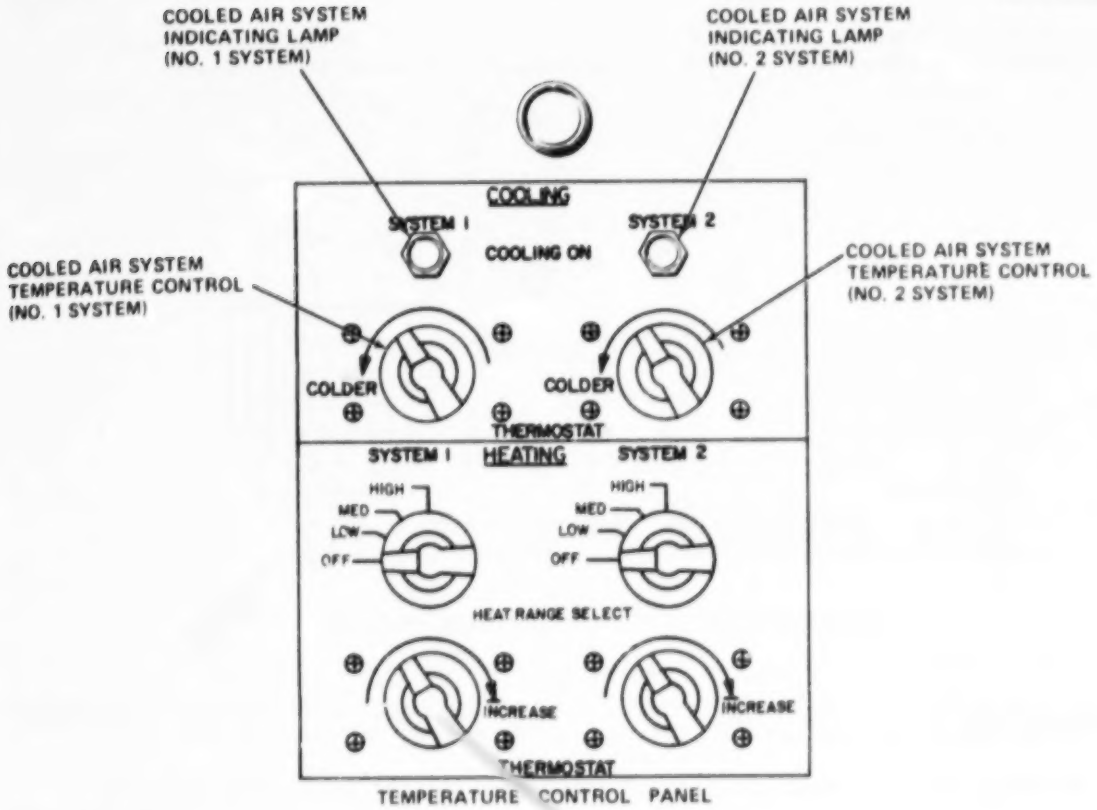
Figure 2-15. Operation to Deliver Cooled Air. (Sheet 2 of 3). (TS 6115-590-12/2-15[2]).

remote operation of ventilating air system is required connect power plants as follows:

(1) Connect 400 Hz auxiliary power cable assembly (fig. 1-15 sheet 2 of 7) to remote fan power input receptacle (fig. 2-9) of nonoperating unit. Connect other end of cable assembly to remote fan power output connector (fig. 2-9) on operating unit.

(2) Place vent system select switch (fig. 2-4) on nonoperating unit in desired system position to operate system No. 1, system No. 2, or systems 1 and 2 together.

(3) Place conditioned air mode select switch (fig. 2-4) on nonoperating unit in OFF position.



STEP 10. OBSERVE THAT APPLICABLE COOLED AIR SYSTEM INDICATING LAMP IS ILLUMINATED INDICATING THAT ONE OR BOTH COOLED AIR SYSTEM TEMPERATURE CONTROLS IS CALLING FOR COOLING.

STEP 11. ADJUST APPROPRIATE COOLED AIR SYSTEM TEMPERATURE CONTROL AS REQUIRED. ROTATE CONTROL COUNTERCLOCKWISE TO DECREASE TEMPERATURE AND CLOCKWISE TO INCREASE TEMPERATURE.

TS 6115-590-12/2-15 ③

Figure 2-15. Operation to Deliver Cooled Air. (Sheet 3 of 3). (TS 6115-590-12/2-15③).

(4) Place remote operation switch (fig. 2-1) on operating power plant in OPERATE RESET position then release switch. Place remote operation switch (fig. 2-12) on nonoperating power plant in OPERATE RESET position then release switch.

(5) When ventilating air from the nonoperating power plant is no longer required, place remote operation switch (fig. 2-1) on both power plants in the OFF position and disconnect the power cables.

k. Operation to Deliver Auxiliary 400 Hz Power. If additional 400 Hz electrical power is required from the power plant connect and operate the power plant as follows:

NOTE

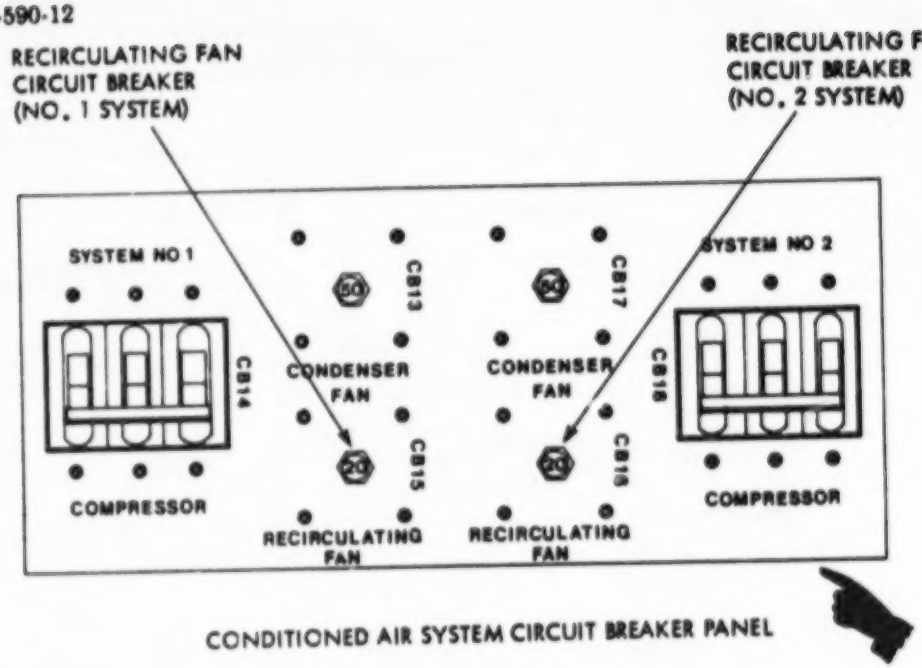
If No. 1 auxiliary power output is operated, only No. 2 auxiliary conditioned air or heating system will operate. If No. 2 auxiliary power output is operated, only No. 1 auxiliary conditioned air or heating system will operate. If both auxiliary power outputs are used, neither conditioned air system will operate.

(1) Connect 400 Hz electrical power output cable assembly (fig. 1-15), sheet 2 of 7) to 400 Hz auxiliary power receptacles (fig. 2-9) and to point of use.

(2) Operate power unit for delivery of 400 Hz power as described in paragraph 2-11b.

(3) Place auxiliary power switches for desired outputs (output 1, output 2, or both) in RESET OPERATE position (fig. 2-3). Power plant will deliver 400 Hz from the 400 Hz auxiliary power switches.

(4) When 400 Hz auxiliary power is no longer required, place auxiliary power switches (fig. 2-3) in OFF position and disconnect 400 Hz electrical power output cable assembly.



STEP 1. REFER TO FIGURE 2-10. CHECK THAT CONDITIONED AIR DUCT ASSEMBLIES ARE CONNECTED TO THE POWER UNIT RETURN AIR INLETS, TO THE AIR OUTLETS, AND TO THE POINT OF USE.

STEP 2. PRESS RESET BUTTONS ON RECIRCULATING FAN CIRCUIT BREAKERS IN TO RESET POSITION.

TS 6115-590-12/2-16 ①

Figure 2-16. Operation to Deliver Heated Air (Sheet 1 of 3). (TS 6115-590-12/2-16[1]).

Section II. Operation of Auxiliary Equipment

2-13. General

The power plant is equipped with a 2¼ pound dry charge fire extinguisher, bracket mounted on the remote power connection panel (fig. 2-9). The extinguisher, charged with purple K dry chemical, is suitable for all type fires. A squeeze of the trigger breaks the seal disc in the top of the pressurized dry chemical shell and starts the discharge. When trigger is released, discharge stops, permitting intermittent discharge. Once seal disc is broken, valve will hold pressure in shell only for a few hours. After using, replace with a new shell immediately.

2-14. Use of Fire Extinguisher

a. To use the fire extinguisher, point the nozzle at the base of the flame and squeeze trigger. Apply chemical until all signs of fire have been extinguished.

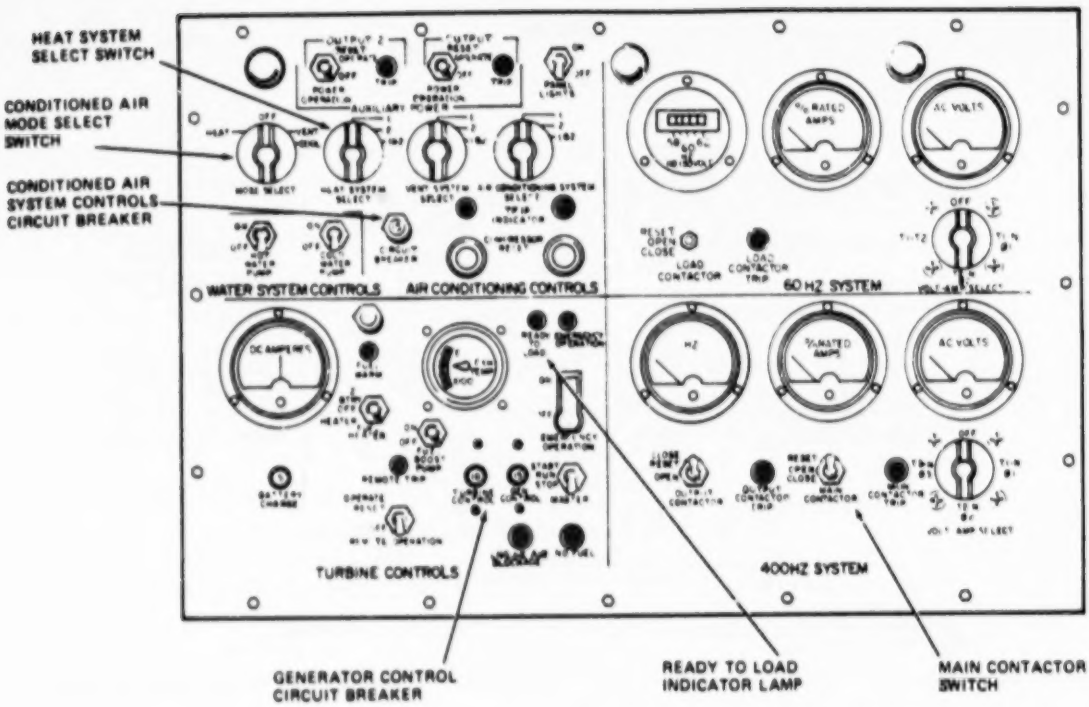
b. Recharging. Recharge immediately after using. Squeeze trigger to vent pressure. Unscrew and discard used shell. Remove dry chemical remaining in head. Insert new indicator tab into trigger. Screw new shell firmly into head. Insert new indicator tab into control head.

c. Maintenance. Semiannually, unscrew shell from head. Be sure trigger works freely and nozzle is clean. Follow maintenance instructions on shell. Insert new indicator into trigger. Screw shell firmly into head. Insert new indicator into control head.

Section III. Operation Under Unusual Conditions

2-15. Operation in Extreme Cold

a. The power plant will operate satisfactorily at ambient temperatures as low as -25°F. However, special precautions should be observed for the water system and the batteries. Operating fuel should be used that is compatible to low temperatures [para. 1-7b (2) (a)] and precautions should be taken to prevent accumulation of moisture in the fuel supply.



STEP 3.	CHECK THAT READY TO LOAD INDICATOR LAMP IS ILLUMINATED INDICATING THAT ENGINE IS READY FOR LOAD.
STEP 4.	CHECK THAT GENERATOR CONTROL CIRCUIT BREAKER IS PRESSED IN TO THE RESET POSITION.
STEP 5.	MOMENTARILY PLACE MAIN CONTACTOR SWITCH IN RESET POSITION THEN PLACE SWITCH IN CLOSE POSITION.
STEP 6.	PLACE HEAT SYSTEM SELECT SWITCH IN POSITION FOR THE SYSTEM TO BE OPERATED; SYSTEM 1, SYSTEM 2, OR SYSTEMS 1 & 2 TOGETHER.
STEP 7.	PRESS RESET BUTTON ON CONDITIONED AIR SYSTEM CONTROLS CIRCUIT BREAKER IN TO RESET POSITION.
STEP 8.	PLACE CONDITIONED AIR MODE SELECT SWITCH TO HEAT POSITION. REFER TO STEPS 9 AND 10 FOR TEMPERATURE ADJUSTMENT.
CAUTION	PLACE MAIN CONTACTOR SWITCH IN OPEN POSITION AND CONDITIONED AIR MODE SELECT SWITCH IN OFF POSITION IF HEATED AIR SYSTEM FAILS TO OPERATE OR ANY OTHER OBVIOUS MALFUNCTION OCCURS. REPORT MALFUNCTION TO ORGANIZATIONAL MAINTENANCE PERSONNEL.

TS 6115-590-12/2-16 (2)

Figure 2-16. Operation to Deliver Heated Air. (Sheet 2 of 3). (TS 6115-590-12/2-16(2))

b. When operating in temperatures below freezing, connect electrical connectors on supply and drain water hose assembly and dual water hose assembly to water line heater connectors on power plant receptacle panel. Connect water recirculating hose assembly to connectors on shelter. If operation of the power plant is to be discontinued for more than 15 minutes during extreme cold conditions, drain and dry the water system as described in paragraph 4-4a (3).

c. Keep batteries fully charged at all times.

CAUTION

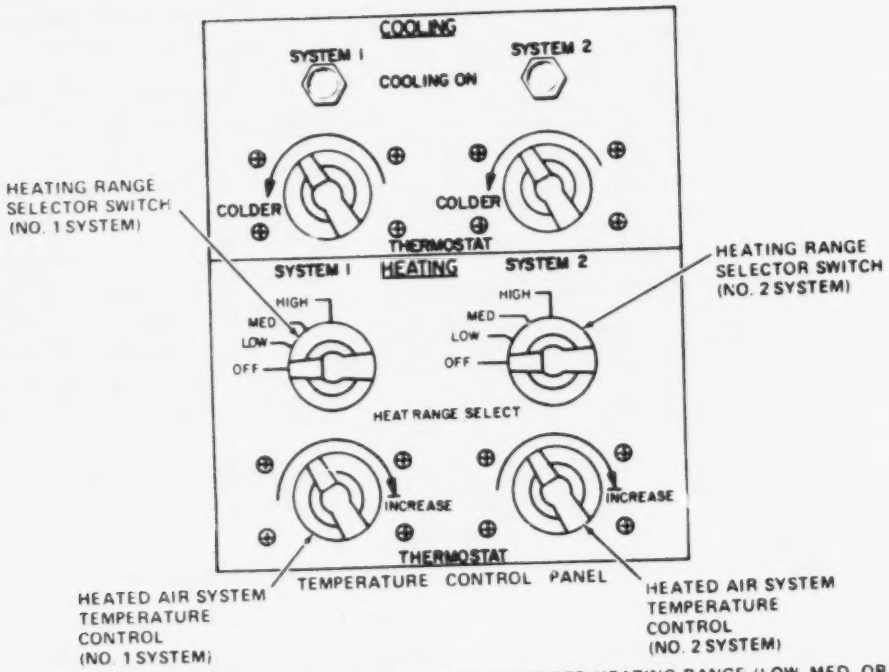
Operate the power plant for at least 1 hour after adding water to batteries. Water added to batteries may freeze unless it is immediately mixed with electrolyte. Remove frozen batteries from the power plant immediately upon discovery to avoid damage caused by leaking from cracked cases when the battery thaws.

d. For efficient starting and operation in ambient temperature below -25°F, a winterization kit must be installed that contains nickel-cadmium batteries and the following procedures must be observed.

NOTE

For Operation Below -25°F Ambient use Lubricating Oil Per MIL-L-7808. Flush System when Winterization Kit is Installed or Removed.

(1) Check that the turbine and heater battery activation circuit breakers, located on the receptacle panel, are pulled out prior to connecting the batteries.



STEP 9. POSITION APPLICABLE HEATING RANGE SELECTOR SWITCH IN THE DESIRED HEATING RANGE (LOW, MED, OR HIGH).

STEP 10. ADJUST APPROPRIATE HEATED AIR SYSTEM TEMPERATURE CONTROL AS REQUIRED FOR TEMPERATURE ADJUSTMENT WITHIN THE SELECTED HEATING RANGE. ROTATE CONTROL CLOCKWISE TO INCREASE TEMPERATURE AND COUNTERCLOCKWISE TO DECREASE TEMPERATURE.

TS 6115-590-12/2-16 ③

Figure 2-16. Operation to Deliver Heated Air (Sheet 3 of 3). (TS 6115-590-12/2-16③).

(2) Insure that the nickel-cadmium batteries are fully charged.

WARNING

Battery electrolyte is very corrosive (Potassium Hydroxide). Wear rubber gloves, apron and face shield when handling leaking batteries. If battery electrolyte (Potassium Hydroxide) is spilled on clothing, or other material, wash immediately with clean water. If spilled on personnel, start flushing the affected area immediately with large amounts of clean water. Continue flushing until medical assistance arrives.

CAUTION

When servicing or adding water to nickel-cadmium batteries, do not use a hydrometer or syringe that has been used to service lead-acid batteries. Residue acid induced in the electrolyte will destroy the batteries.

(3) Check that the master switch on the instrument panel is in the STOP kposition, and the fuel heater switch is in the OFF position.

(4) Press in the turbine and heater battery activation circuit breakers on the receptacle panel and wait until the breakers snap out to the OPEN position; repeat the procedure.

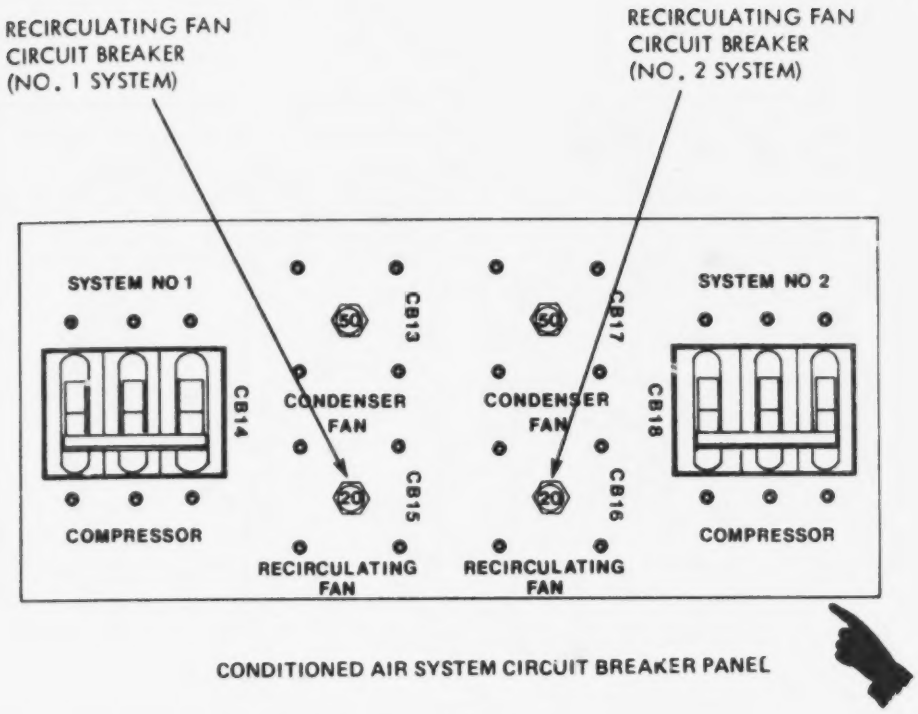
(5) Press the fuel heater ciruit breaker on the receptacle panel to the IN position. Place the fuel heater switch on the instrument panel in HEATER position. Leave switch on until the fuel warm light on the instrument panel illuminates. When fuel is warmed, place the fuel heater switch in the No. 2 battery position.

(6) Refer to paragraph 2-10 and start the power plant.

2-16. Operation in Extreme Heat

a. The power plant will operate satisfactorily at ambient temperatures up to 125°F. (52°C.).

b. The operation of the power plant in extreme heat increases the evaporation rate of water from battery electrolyte. Check battery electrolyte level



STEP 1. REFER TO FIGURE 2-10. CHECK THAT CONDITIONED AIR DUCT ASSEMBLIES ARE CONNECTED TO THE POWER UNIT RETURN AIR INLETS TO THE AIR OUTLETS, AND TO THE POINT OF USE.

STEP 2. PRESS RESET BUTTONS ON RECIRCULATING FAN CIRCUIT BREAKERS IN TO RESET POSITION.

TS 6115-590-12/2-17 ①

Figure 2-17. Operation to Deliver Ventilated Air (Sheet 1 of 2). (TS 6115-590-12/2-17[1]).

frequently (para. 4-1b) during extreme heat conditions.

2-17. Operation in Dusty or Sandy Areas

a. If possible, erect a protective barrier for power plant. Dust and sand shorten life of equipment parts and cause mechanical failure. Utilize natural barriers. Wipe down power plant at frequent intervals using approved cleaning solvent. If water is plentiful, wet down surrounding area beyond immediate operating areas.

b. Lubricate power plant in accordance with lubrication order. Clean oil fill and level cap and area around oil tank fill opening frequently to prevent dust and abrasive material from entering engine.

c. Keep fuel supply tank cap tightly closed to prevent dust and sand from entering tank. Clean area around fuel supply tank cap before removing cap to add fuel.

d. Inspect and clean collector box engine air inlet filter daily.

e. Keep all doors and panels on the power plant closed as much as possible.

2-18. Operation Under Rainy or Humid Conditions

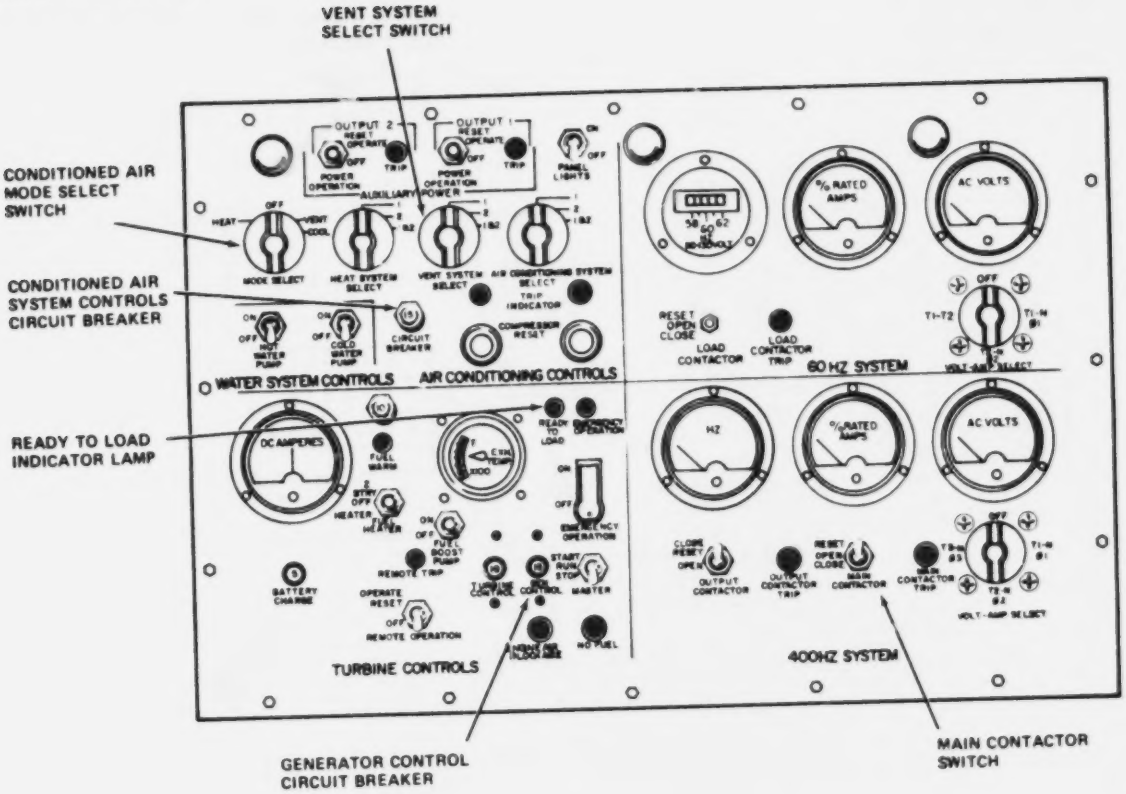
a. The power plant is weatherized to operate satisfactorily under rainy or humid conditions. However, precautions should be observed to insure protection of the equipment from excessive moisture.

b. Secure all panels and doors on power plant to minimize admittance of moisture to power unit components.

CAUTION

Install anti-icing hose to air intake filter deicer manifold if temperatures approach freezing. Adjust compressor air valve periodically to insure that no ice is forming on the air filter.

c. Close and secure instrument panel access door (fig. 1-1) after power plant has been started and adjusted for operation to prevent accumulation of



STEP 3.	CHECK THAT READY TO LOAD INDICATOR LAMP IS ILLUMINATED INDICATING THAT ENGINE IS READY FOR LOAD.
STEP 4.	CHECK THAT GENERATOR CONTROL CIRCUIT BREAKER IS PRESSED IN TO THE RESET POSITION.
STEP 5.	MOMENTARILY PLACE MAIN CONTACTOR SWITCH IN RESET POSITION THEN PLACE SWITCH IN CLOSE POSITION.
STEP 6.	PLACE VENT SYSTEM SELECT SWITCH IN POSITION FOR THE SYSTEM TO BE OPERATED, SYSTEM 1, SYSTEM 2, OR SYSTEMS 1 & 2 TOGETHER.
STEP 7.	PRESS RESET BUTTON ON CONDITIONED AIR SYSTEM CONTROLS CIRCUIT BREAKER IN TO RESET POSITION.
STEP 8.	PLACE CONDITIONED AIR MODE SELECT SWITCH IN VENT POSITION.
CAUTION:	PLACE MAIN CONTACTOR SWITCH IN OPEN POSITION AND CONDITIONED AIR MODE SELECT SWITCH IN OFF POSITION IF VENTILATING AIR SYSTEM FAILS TO OPERATE OR ANY OTHER OBVIOUS MALFUNCTION OCCURS. REPORT MALFUNCTION TO MAINTENANCE PERSONNEL.

TS 6115-590- 12/2-17 (2)

Figure 2-17. Operation to Deliver Ventilating Air. (Sheet 2 of 2). (TS 6115-590-12/2-17[2]).

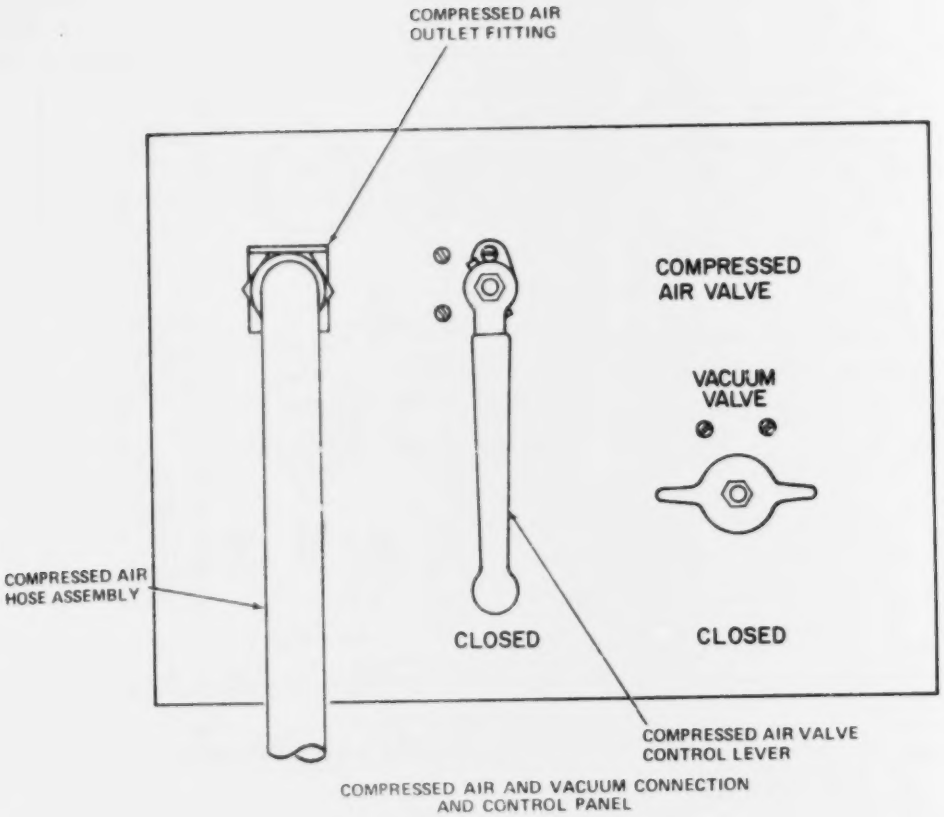
moisture on instruments and controls. Remove excess moisture from instrument and control panels with a clean, dry cloth.

d. When power plant is not operating, cover unit with a tarpaulin or other protective covering to prevent entry of moisture.

2-19. Operation in Salt Water Areas

a. During periods when power plant is not operating, wash down exterior of power unit regularly with fresh water. Avoid directing a water hose or other high pressure water source at openings into interior of power plant. Wash down fins on condensers and evaporators from inside to the outside. Wipe down internal components with an approved cleaning solvent.

b. Carefully inspect components for evidence of corrosion and deterioration of insulation. Inspect all painted surfaces for cracked, peeled, or blistered paint. Coat all exposed surfaces with an approved



STEP 1. CHECK THAT COMPRESSED AIR HOSE ASSEMBLY IS SECURELY CONNECTED TO COMPRESSED AIR OUTLET FITTING AND TO POINT OF USE.

STEP 2. REFER TO FIGURE 2-17, SHEET 2 OF 2. CHECK THAT READY TO LOAD INDICATOR LAMP IS ILLUMINATED INDICATING THAT ENGINE IS READY FOR LOAD.

STEP 3. ROTATE COMPRESSED AIR VALVE CONTROL LEVER COUNTERCLOCKWISE TO DELIVER COMPRESSED AIR.

NOTE: ROTATE CONTROL LEVER SLOWLY TO OBTAIN SMOOTH COMPRESSED AIR DELIVERY.

STEP 4. PLACE CONTROL LEVER IN THE CLOSED POSITION TO STOP COMPRESSED AIR DELIVERY.

TS 6115-590-12/2-18

Figure 2-18. Operation to Deliver Compressed Air. (TS 6115-590-12/2-18).

corrosion preventive paint. Report severe corrosion damage to direct support maintenance.

2-20. Operation in Snow

a. The power plant will operate satisfactorily during snow conditions. However, precautions should be taken to prevent accumulation of snow at the power unit.

b. Observe procedures described for operation in extreme cold (paragraph 2-15).

c. Erect suitable barriers to prevent air inlet and exhaust openings from being clogged by driven snow.

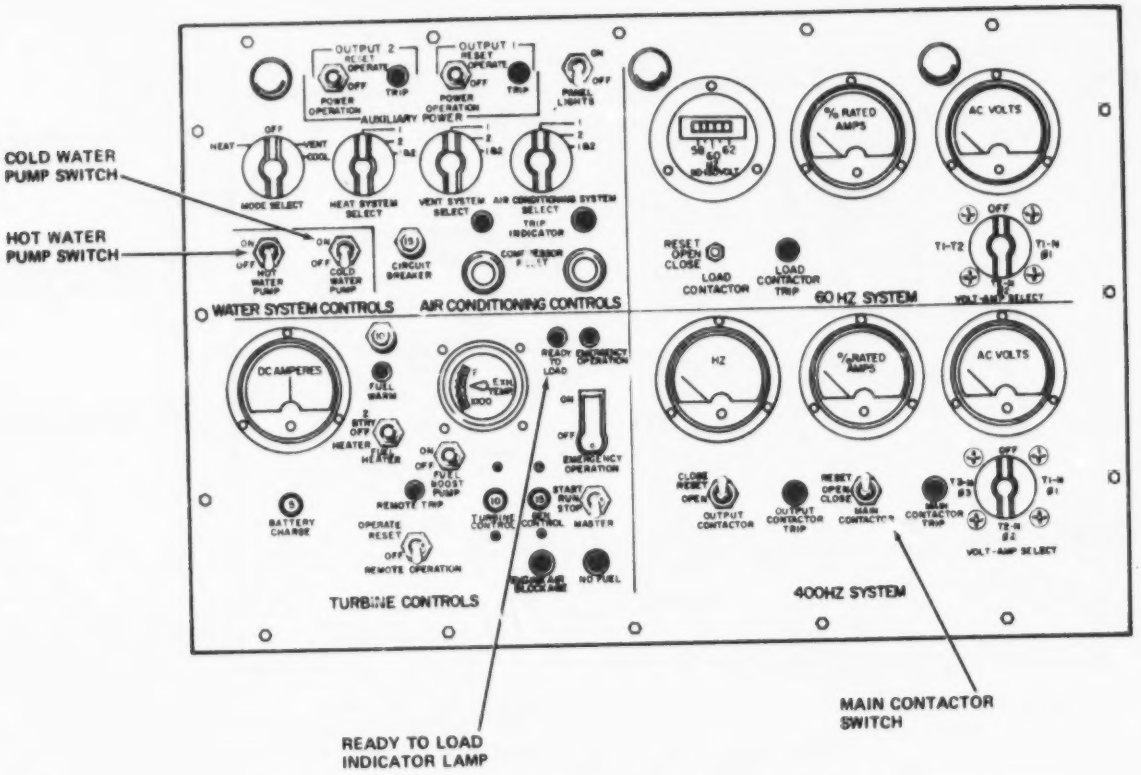
CAUTION

Barriers must not block the air flow during operation. Install anti-icing hose to air intake filter deicer manifold if temperatures approach freezing. Adjust compressor air valve periodically to insure that no ice is forming on the air filter.

d. Prevent snow from collecting around access panels and door so as to prevent opening.

2-21. Operation in Mud

a. The power plant will operate satisfactorily in mud provided sufficient support is provided the skids from sinking to the point that mud blocks the



STEP 1. REFER TO FIGURE 2-19, SHEET 2 OF 2. CHECK THAT DUAL WATER HOSE ASSEMBLY, WATER RECIRCULATING HOSE ASSEMBLIES, AND SUPPLY AND DRAIN HOSE ASSEMBLY ARE SECURELY CONNECTED TO WATER INLET AND OUTLET CONNECTION PANEL AND TO THE POINT OF USE. CHECK THAT HOT WATER VALVE AND COLD WATER VALVE ARE IN THE CLOSED POSITION.

STEP 2. CHECK THAT READY TO LOAD INDICATOR LAMP IS ILLUMINATED INDICATING THAT ENGINE IS READY TO LOAD.

STEP 3. MOMENTARILY PLACE MAIN CONTACTOR SWITCH IN RESET POSITION THEN PLACE SWITCH IN CLOSE POSITION.

STEP 4. PLACE HOT WATER PUMP AND COLD WATER PUMP SWITCH IN ON POSITION.

TS 6115-590-12/2-19 ①

Figure 2-19. Operation to Deliver Hot and Cold Water. (Sheet 1 of 2). (TS 6115-590-12/2-19[1]).

various fuel and moisture drains in the bottom of the enclosure.

b. The power plant should be inspected frequently to insure that mud has not plugged any drains, fittings, or other openings.

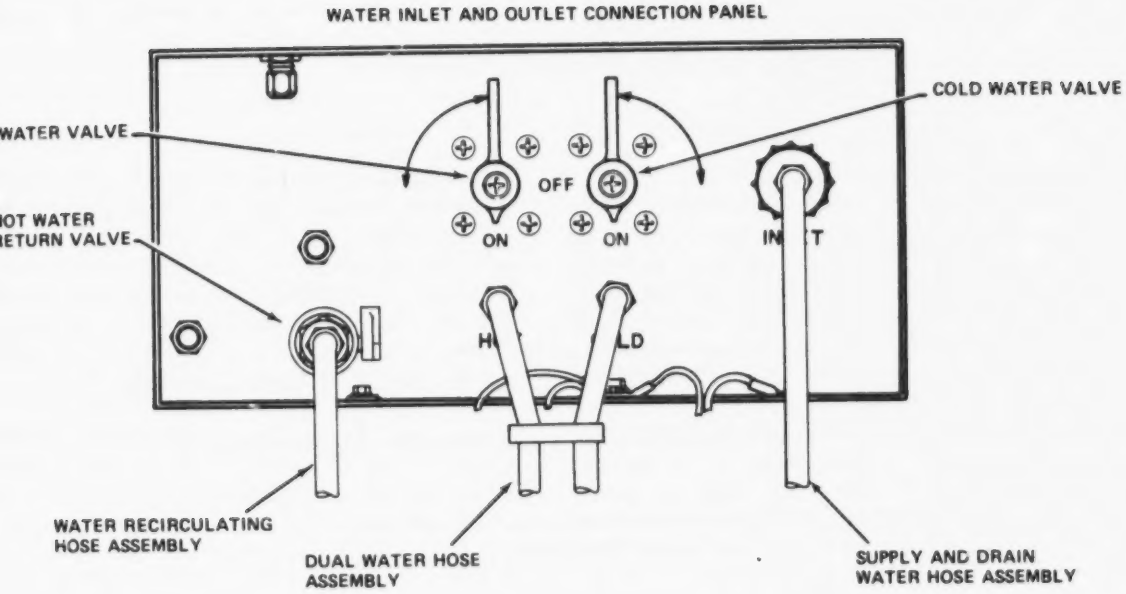
c. Boards or other suitable support material should be placed around the power plant to provide solid dry surfaces for personnel operating and servicing the power plant.

2-22. Operation at High Altitudes

The power plant will operate satisfactorily at altitudes up to 10,000 feet except that cooling capacity will be reduced with altitude.

2-23. Operation Below Sea Level

The power plant will operate satisfactorily below sea level.



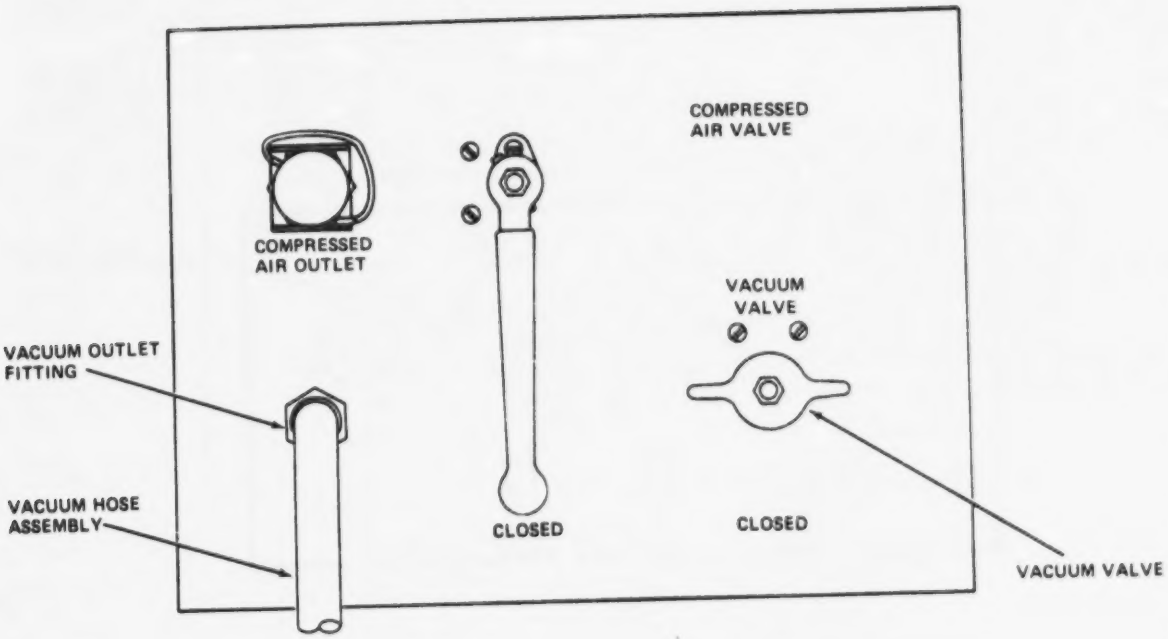
STEP 5. PLACE HOT WATER VALVE, COLD WATER VALVE AND HOT WATER RETURN VALVE IN ON POSITION.

CAUTION: IF WATER DELIVERY IS UNATTAINABLE OR ANY OTHER OBVIOUS MALFUNCTION OCCURS, PLACE PUMP SWITCHES ON INSTRUMENT PANEL IN OFF POSITION AND PLACE HOT WATER VALVE AND COLD WATER VALVE IN OFF POSITION. REPORT MALFUNCTION TO ORGANIZATIONAL MAINTENANCE PERSONNEL.

NOTE: APPROXIMATELY 15 MINUTES IS REQUIRED FOR HEATING THE HOT WATER.

TS 6115-590-12/2-19 ②

Figure 2-19. Operation to Deliver Hot and Cold Water (Sheet 2 of 2). (TS 6115-590-12/2-19②).



COMPRESSED AIR AND VACUUM CONNECTION AND CONTROL PANEL

STEP 1. CHECK THAT VACUUM HOSE ASSEMBLY IS SECURELY CONNECTED TO VACUUM OUTLET FITTING AND TO POINT OF USE.

STEP 2. REFER TO FIGURE 2-19 SHEET 1 OF 2, CHECK THAT READY TO LOAD INDICATOR LAMP IS ILLUMINATED INDICATING THAT ENGINE IS READY FOR LOAD.

STEP 3. ROTATE VACUUM VALVE TO OPEN POSITION TO PROVIDE SUCTION.

STEP 4. WHEN SUCTION IS NO LONGER REQUIRED, ROTATE VACUUM VALVE TO CLOSED POSITION.

TS 6115-590-12/2-20

Figure 2-20. Operation to Deliver Vacuum. (TS 6115-590-12/2-20).

CHAPTER 3
OPERATOR/CREW MAINTENANCE INSTRUCTIONS

Section I. Lubrication Instructions

3-1. General

Lubrication of the power plant is accomplished by organizational personnel; however, the operator should insure that the oil level in the oil tank is adequate before operation of the power plant.

Section II. Preventive Maintenance Checks and Service

3-2. General

To insure that the power plant is ready for operation at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance checks and services are described in paragraph 3-3 and table 3-1. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the power unit shall be noted for correction as soon as operation has stopped. Stop operation immediately if a deficiency is noted during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings shall be recorded together with the corrective action taken on from DA 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest opportunity.

3-3. Preventive Maintenance Checks and Services

Preventive maintenance checks and services to be performed by the operator/crew are listed in table 3-1.

3-4. Dual Water Hose Assembly Inspection.

Inspect dual water hose assembly (fig. 1-15, sheet 3 of 7) for damage, signs of leakage, stripped or crossed threads on coupling nuts and electrical connectors, missing or damaged protective caps.

3-5. Supply and Drain Water Hose Assembly Inspection.

Inspect supply and drain water hose assembly for damage, signs of leakage, stripped or crossed threads on coupling nut and electrical connector, missing or damaged protective caps or lugs.

3-6. External Fuel Filter.

The external fuel filter is a vertical, portable filter/separator consisting of an aluminum tank mounted on an aluminum skid. It is a static device which is installed in the fuel system to remove entrained water and solid contaminants in the fuel. Inlet, outlet and water drain connections are provided. The inlet and outlet connections are identical, manually operated 1 inch ball valves. The water drain connection is a ½ inch manually operated ball valve. Quick disconnect couplings for 1 inch hose are provided at the fuel inlet and outlet connections. A plexiglass sight gage with a ball float inside is mounted on the side of the tank to indicate the water level in the tank base. The cover is held in place by four bolts and contains a manual pressure vent valve to permit bleeding air from the unit.

3-7. Maintenance of External Fuel Filter (fig. 3-1).

a. Sight gage inspection.

(1) Inspect sight gage for cracked body or leaking around gasket.

(2) If malfunction exists, refer to organization maintenance.

b. Filter/Separator Assembly Inspection.

(1) Inspect skid and frame for bent or broken member, corrosion and general condition of paint.

(2) Refer all deficiencies to organizational maintenance.

c. Canister and Filter Element Inspection.

(1) Canister and filter element inspection is required to maintain serviceability of the unit.

(2) Inspect the filter element for clogging or rupture. Inspect the canister for a damaged or clogged screen.

WARNING

Depressurize Filter/Separator before removing the cover assembly by opening the manual pressure vent valve located in the center of cover.

Table 3-1. Operator/Crew Preventive Maintenance Checks and Services

B--Before Operation D--During Operation A--After Operation

Item No.	Interval B	Interval D	Interval A	Item to be Inspected	Procedures	Equipment Will Be Reported Not Ready (RED) If:
1	•			Power plant, utility	Walk around unit, look for loose connections, foreign material in makeup air doors, leaks, damage, and general condition (Fig. 2-10).	
				a. Grounding connection	Look for loose or missing grounding cable (Fig. 2-9).	
				b. Fire extinguisher	Check availability of extinguisher and proper pressure (Fig. 2-9).	
				c. External filter/separator	Drain water before float ball reaches indicator mark (Fig. 4-18).	
				d. Fuel and water	Insure that supply is adequate for anticipated length of operation. (Max. consumption, fuel 35 GPH, water 540 GPH).	
2		•		Control panel		
				a. Ammeter DC	Shall indicate between 0 to 30 amps on positive side of meter (Fig. 2-1).	Not indicating a charging current.
				b. Exhaust temperature	Shall not exceed 1225°F (663°C) during steady state operation (Fig. 2-1).	Temperature exceeds 1260°F (682°C).
				c. Frequency meter (400 Hz)	Shall indicate 400 ± 12 Hz (Fig. 2-8).	Above or below 400 ± 12 Hz.
				d. Ammeter AC (400 Hz)	Shall indicate applied current, not to exceed 100% (Fig. 2-8).	
				e. Voltmeter AC (400 Hz)	Shall indicate 120 ± 3 volts (Fig. 2-8).	Above or below 120 ± 3 volts.
				f. Frequency meter (60 Hz)	Shall indicate 60 ± 2 Hz (Fig. 2-7).	
				g. Ammeter AC (60 Hz)	Shall indicate applied current, not to exceed 100% (Fig. 2-7).	
				h. Voltmeter AC (60 Hz)	Shall indicate 120 ± 3 or 240 ± 6 Volts (Fig. 2-7).	Above or below 120 ± or 240 ± 6 Volts.
				i. Engine compartment drains	Shall have no indication of fuel or oil leaking from the drains. NOTE Drains are located in bottom of compartment under left side of enclosure (Fig. 1-2).	There are indications of a fuel or oil leak.

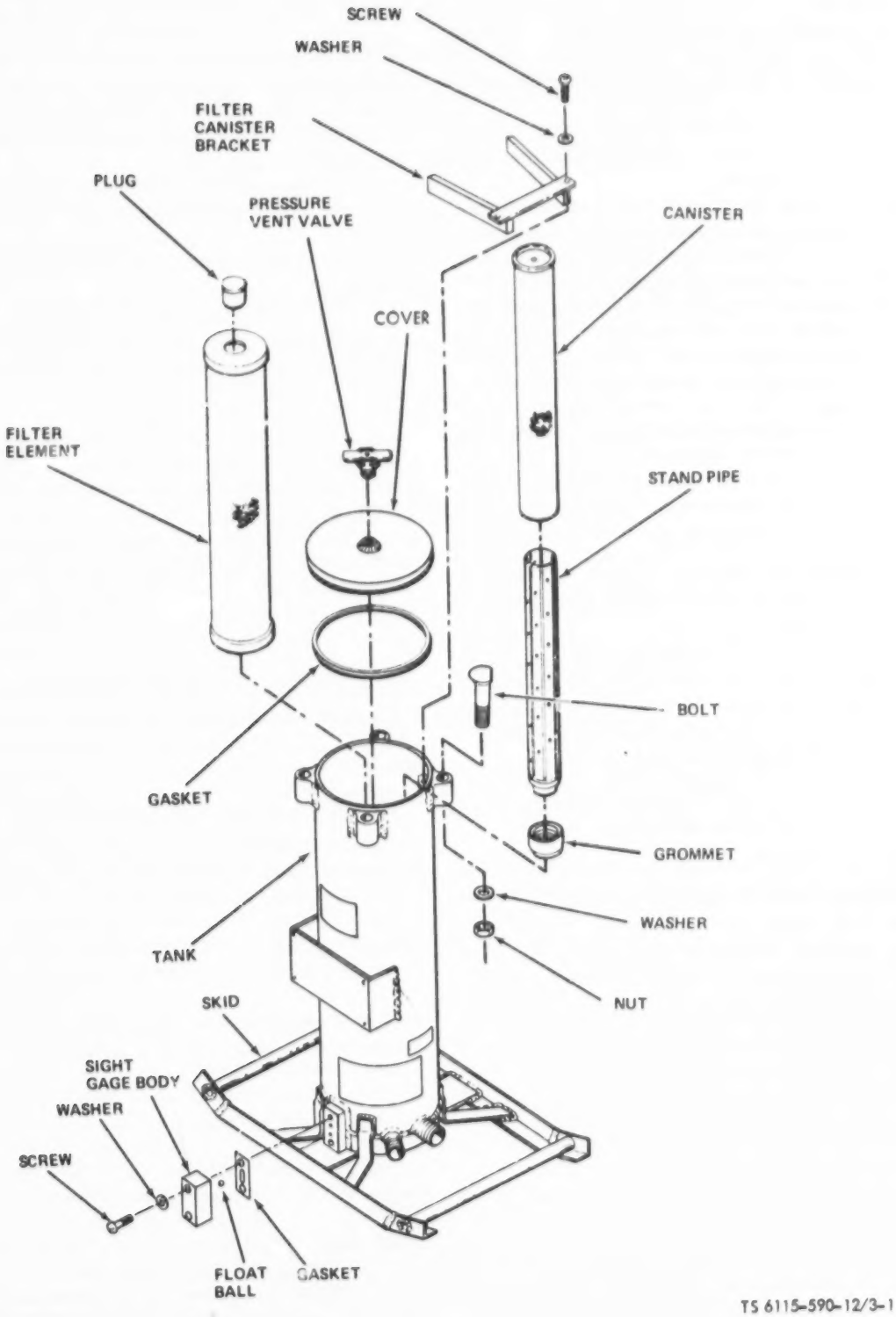


Figure 3-1. Canister and Filter Element, Fuel Filter/Separator. (TS 6115-590-12/3-1).

d. Disassembly and Removal of Canister and Filter Element.

(1) Loosen nuts and washers until each nut is flush with the end of bolt. Each bolt can then be raised and rotated 180 degrees so the flanged portion of the bolt head is clear of cover.

(2) Remove cover and discard gasket.

(3) Remove screws, washers and the filter canister bracket assembly.

(4) Remove filter element from tank and remove aluminum plug. Inspect for clogged or ruptured element. If damaged, replace.

(5) Remove canister assembly from tank.

(6) Inspect canister for cleanliness and torn mesh. If mesh is torn, replace.

(7) Remove grommet and standpipe from the canister. Remove grommet from standpipe.

e. Cleaning.

(1) Clean inside of tank by washing with clean fuel.

(2) Clean canister by washing with clean fuel.

f. Assembly of Canister and Filter Element.

CAUTION

Make certain the grommet is properly seated around the canister. The grommet should cover the mesh screen.

(1) *Install the grommet on the standpipe.* Place the canister over the standpipe and press canister into the grommet. Press the canister assembly over the outlet pipe until the grommet is seated to the shoulder of the inlet pipe.

NOTE

The outlet pipe is the higher pipe of the two within the tank.

(2) Install the aluminum plug in one end of the filter element. Place the opposite end of the element over the inlet pipe and press down until the bottom makes contact with the shoulder of the inlet pipe.

CAUTION

The bracket assembly is not intended to seat on the welded projections inside the housing. Do not attempt to seat the bracket assembly to the projections as this will result in damage to the canister.

(3) Position the bracket assembly over the projections inside of the tank. Install washers and screws.

(4) Insert the cover gasket in the groove of the cover.

(5) Center the cover over the tank.

(6) Raise the four bolts and rotate until the flanged portion of the bolt is over the cover. Tighten the nuts uniformly.

g. Refilling Filter/Separator.

(1) To refill the filter/separator, close the manual outlet valve and open the manual pressure vent valve to permit air to be expelled until the unit is full of fuel.

(2) Close the vent valve and slowly open the outlet valve. If the filter element has been ruptured, place the outlet hose in the fuel source and recirculate for five minutes to remove any foreign material from the system.

3-8. Ejector Assembly Inspection

Inspect ejector assembly (fig. 1-15, sheet 3 of 7) for damaged fittings, crossed threads, broken welds and missing hardware.

3-9. Wiring Harness Inspection.

Inspect all accessible wiring harnesses for burned, broken, frayed or loose wires, damaged connector pins, terminals and connectors.

Section III. Troubleshooting

3-10. General

Operator/crew troubleshooting is limited to visual inspection. Malfunctions requiring determination of cause of trouble or the replacement of parts shall be reported to organizational maintenance.

CHAPTER 4
ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. Service Upon Receipt of Material.

4-1. Inspecting and Servicing the Equipment

a. Inspection.

(1) Examine power unit identification plate for positive identification of power unit.

(2) Visually inspect exterior of power plant for evidence of damage that may have occurred during storage or transportation.

NOTE

Check for plastic indicator tabs on fire extinguisher (fig. 1-1), trigger and nozzle. If indicator tabs are missing, replace fire extinguisher with a new extinguisher.

(3) Release tarpaulin cover straps, carefully roll tarpaulin and secure on top of power plant. Open battery access and storage compartment door (fig. 1-1), condenser compartment access doors, condenser air outlet doors (fig. 1-1 and fig. 1-2), refrigeration compressor compartment access door (fig. 1-2), conditioned air outlet compartment access door (fig. 1-2), and refrigeration compartment access door (fig. 1-1). Remove all accessory components stowed in the compartments. Visually inspect all removed accessory components for damage and check that all required accessory components are with the unit. Visually inspect compartment interiors and components installed in the compartments for possible damage caused by stowed accessory components, for accumulations of debris or other foreign material, and for evidence of corrosion. Carefully inspect cooling fins of condensers and evaporators for evidence of corrosion, damage, and accumulation of foreign material.

(4) Open instrument panel access door (fig. 1-1), conditioned air system circuit breaker panel access door and air temperature control panel access door (fig. 1-1). Check that all controls or switches are in the off or neutral position and instruments are indicating the de-energized position. Visually inspect all instruments, switches, indicating lamps, and circuit breakers for damage, legibility of markings, and for evidence of corrosion.

(5) Remove water compartment access panel (fig. 1-1), conditioned air electrical control components access panel, fuel and oil compartments access panel, engine and skid access panel (fig. 1-2), engine turbine section and heat exchanger access panel, and heat exchanger compartment access panel. Visually inspect compartment interiors for damage, evidence of corrosion and accumulations of foreign material. Inspect wiring components for frayed or otherwise damaged insulation, burns, and corrosion. Inspect plumbing lines and fittings for evidence of damage, leakage, and corrosion. Inspect all components for secure installation, damage, evidence of damage, leakage, and corrosion. Inspect all components for secure installation, damage, evidence of leakage, and corrosion.

(6) Check all exhaust openings in top of unit for obstructions and for damage.

(7) All damage or deficiencies that could affect operation of the power unit shall be corrected before operation of the power unit. Damage or deficiencies that would not affect operation immediately shall be noted and corrected as soon as possible.

WARNING

Either Lead-Acid or Nickel-Cadmium batteries may be used in this equipment. Injury or death may result if the Potassium Hydroxide electrolyte is added to the Lead Acid battery. Also do not add Sulphuric Acid to the Nickel-Cadmium battery.

WARNING

Battery electrolyte is very corrosive. Wear rubber gloves, apron and face shield when handling leaking batteries. If battery electrolyte is spilled on clothing or other material, wash immediately with clean water. If spilled on personnel start flushing the affected area immediately with large amounts of clean water. Continue flushing until medical assistance arrives.

b. Battery Servicing.

NOTE

The power plant is shipped in two different configurations: non-winterized and winterized. The non-winterized unit has Lead-Acid batteries and will operate down to -25°F. The winterized unit has Nickel-Cadmium batteries and will operate down to -65°F.

CAUTION

Tools and test equipment used to service the Lead-Acid battery must not be used to service the Nickel-Cadmium Battery.
Tools and test equipment used to secure the Nickel-Cadmium battery must not be used to service the Lead-Acid battery.

(1) Lead-Acid Batteries.

(a) Open battery access and storage compartment door (fig. 1-1); remove wingnuts securing battery cover and remove battery cover.

CAUTION

Avoid spilling battery electrolyte on painted surfaces. Damage to painted surfaces may result.

(b) Refer to TM 9-6140-200-15 and service batteries.

(c) Insure batteries are installed and connected as shown.

(d) Install battery cover and secure with wingnuts.

(2) Nickel-Cadmium Battery.

(a) Open battery access and storage compartment door (fig. 1-1).

(b) Refer to TM 11-6140-203-15-3 and service the batteries.

(c) Insure batteries are installed and connected.

4-2. Installation

a. Location.

(1) Locate power plant as close as possible to the elements to be serviced by the power plant. Provide sufficient clear area around the unit to permit opening of all doors and panels and unobstructed air flow to the air inlets and from the exhaust openings. Provide adequate drainage of the power unit operating area.

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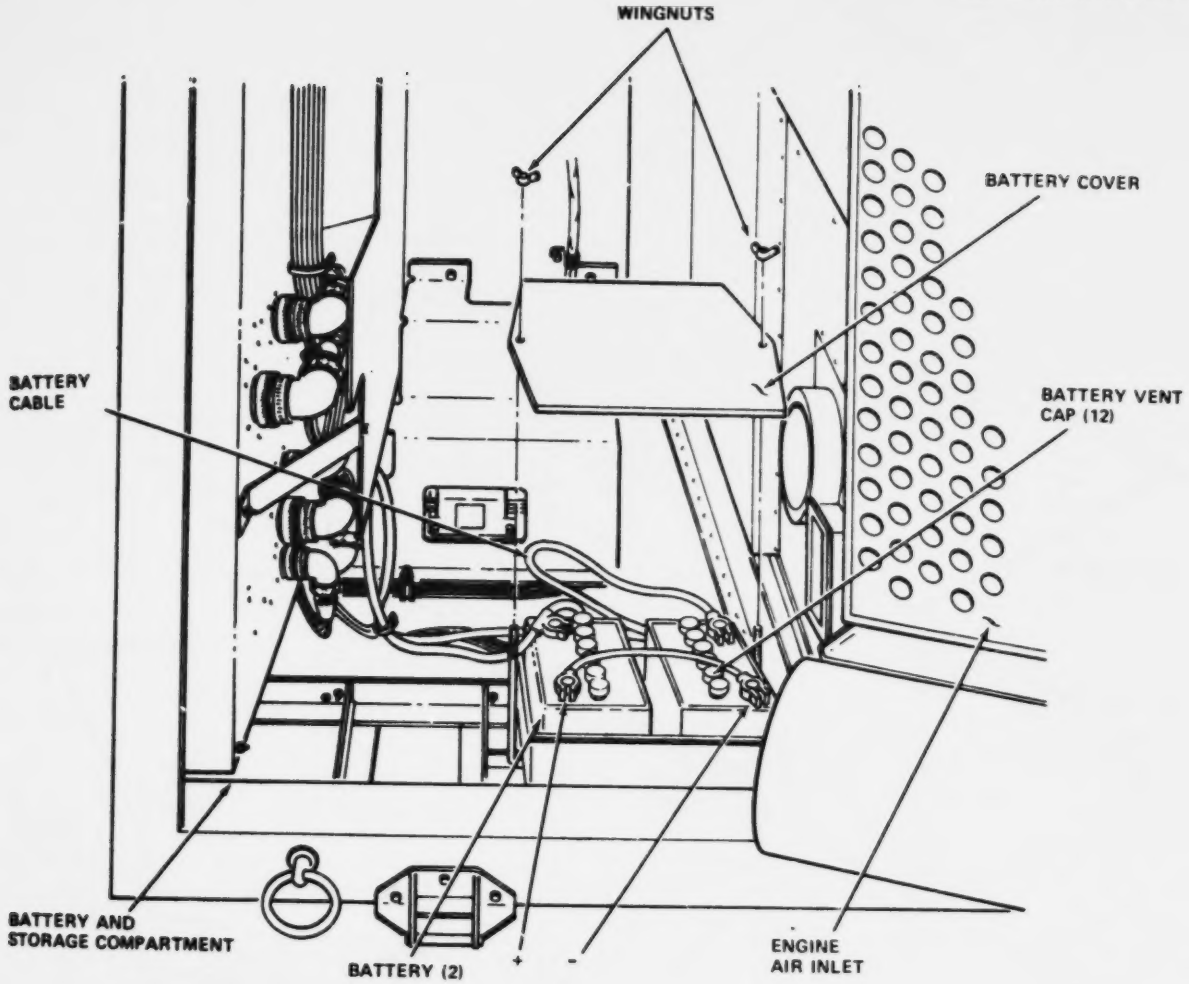


Figure 4-1. Battery Servicing. (TS 6115-590-12/4-1).

NOTE

Locations where power plant may be exposed to high humidity, sand, or dust, should be avoided whenever possible. Moisture condenses on power plant parts and may cause corrosion. Sand, dust, and dirt shorten life of parts and can cause mechanical failure.

(2) Position the power plant on any reasonably level surface, then adjust position to obtain as near level as possible.

NOTE

Do not operate power unit if front to rear axis is more than 15 degrees from level with up to 10 degrees displacement to either side.

b. Installation Connections.

(1) *Grounding Procedure.* The power unit shall be grounded in order to prevent shock due to defective insulation, or external electrical faults. Poor grounding can endanger personnel, may damage equipment, and can create interference in communication or electronic circuits. Install one of the following items as a grounding device:

(*a*) Drive a ground rod (fig. 1-15, sheet 7 of 7) to a depth of at least 8 feet. This is the preferred device which is shipped with the power unit. (An existing underground pipe may be used in an emergency.)

(*b*) Bury a ¼ inch thick iron or steel plate or 1/16 inch thick aluminum or copper plate, 18 inch x 18 inch in size, with a ground cable attached, to depth of at least 4 feet.

(*c*) Position a ¼ inch thick iron or steel plate, or 1/16 inch thick aluminum or copper plate, approximately 18 inch x 18 inch size, on the hard ground or bedrock beneath the trailer stand or roll the wheel of a trailer or truck until it comes to rest on top of the grounding plate.

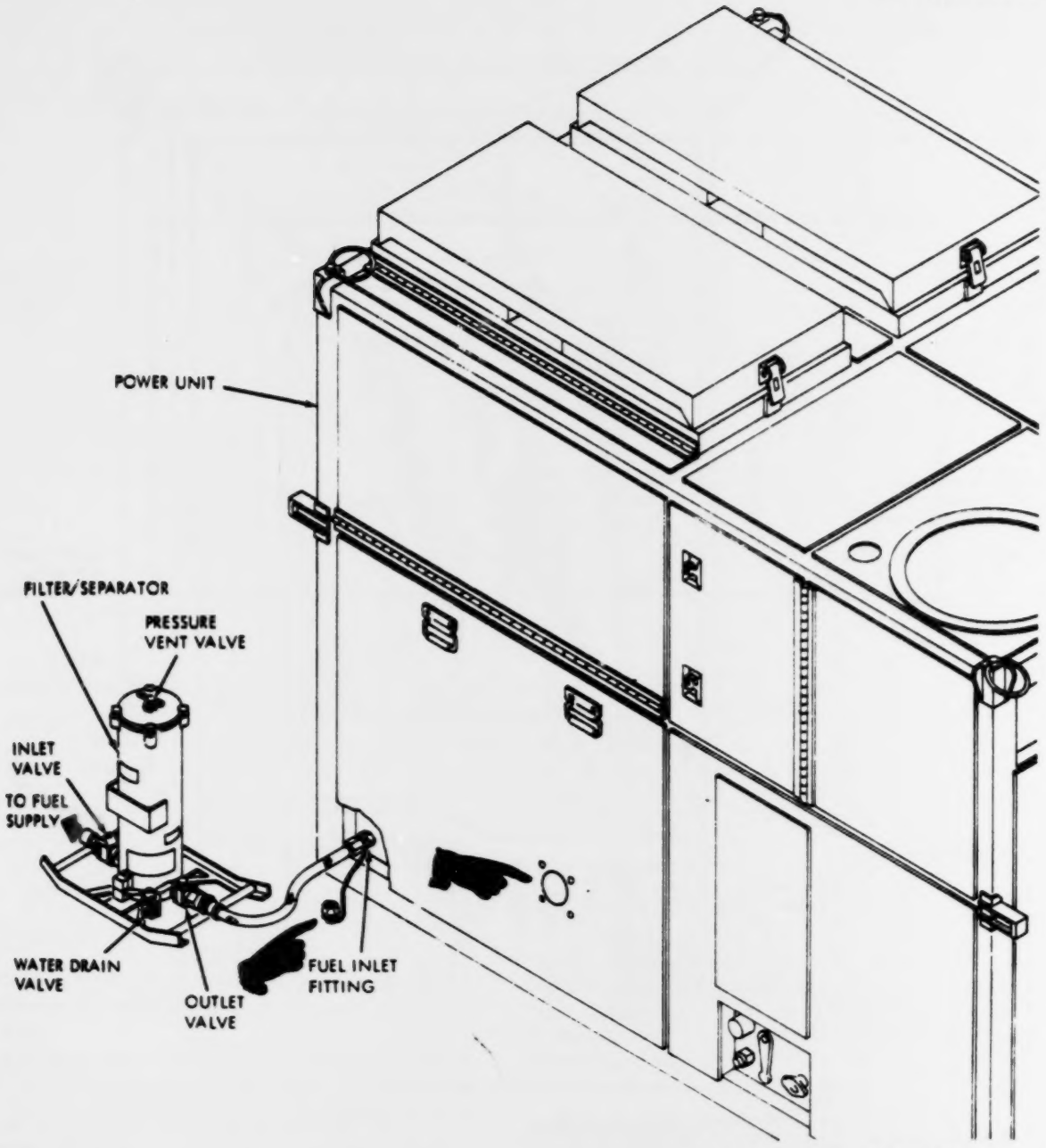


Figure 4-2. Fuel Supply Connection to Power Unit (TS 6115-590-12/4-2)

(*d*) Saturate the area around the grounding device with water to increase conductivity. Ground cable should be copper. Braided cable is the best, but No. 6 AWC gauge (or larger) copper wire will suffice. Connect the ground cable from the grounding device to the power plant frame ground stud (E2) (fig. 2-9) and tighten nut securely.

WARNING

Do not operate the power unit until a suitable ground connection has been made. Do not rely on grounding or safety devices to prevent accidents. Electrical circuits and equipment are potentially hazardous. Personnel should always exercise caution to prevent injury or possible death due to electrical shock.

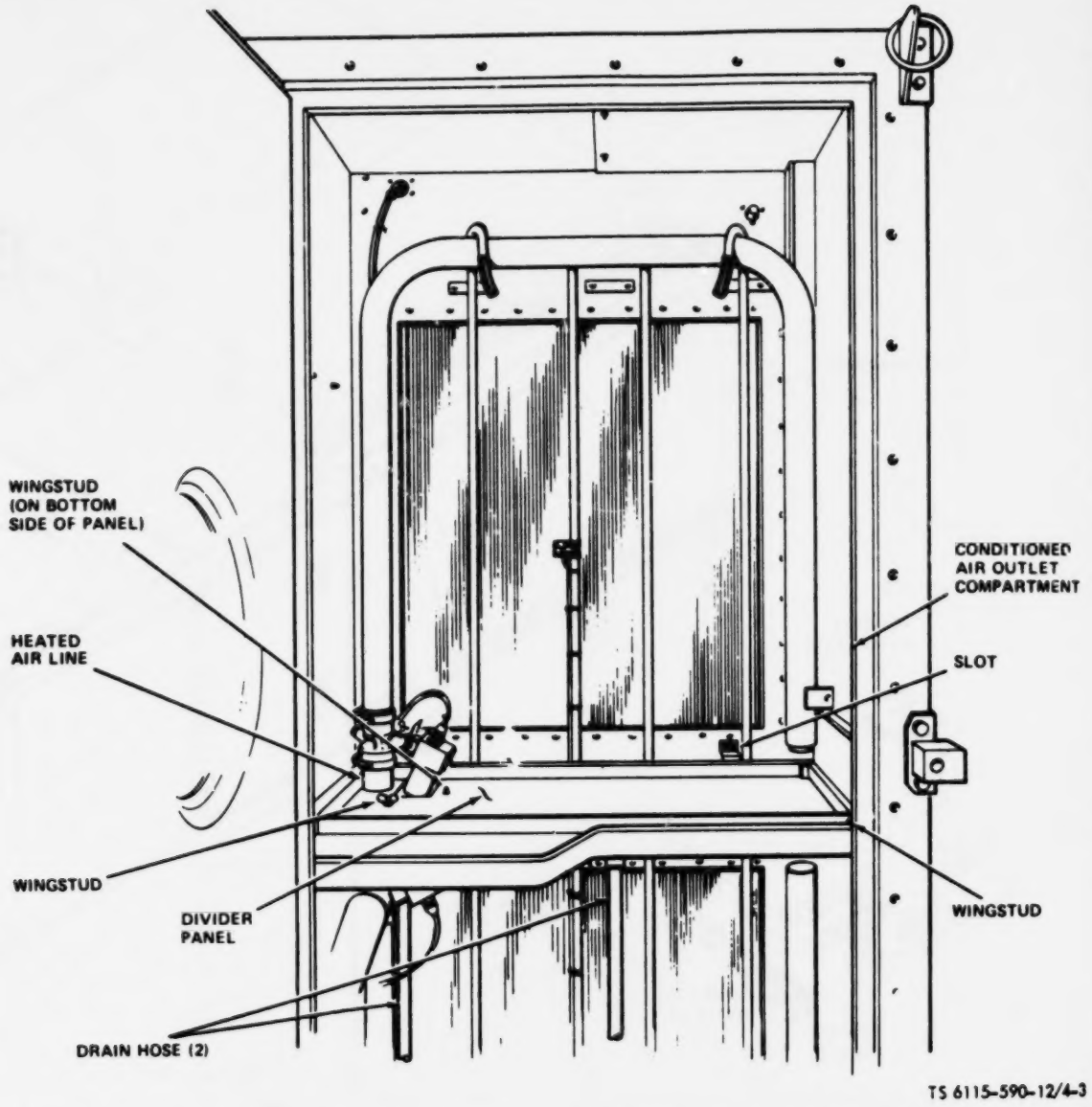


Figure 4-3. Conditioned Air Outlet Compartment Divider Panel Installation. (TS 6115-590-12/4-3)

(2) *Fuel supply connection.* Connect external fuel system filter assembly (fig. 1-15, sheet 5 of 7) to fuel inlet fitting as shown in fig. 4-2. Connect fuel hose assembly between fuel supply and filter assembly. Check fuel lines and fuel filter assembly for evidence of leakage. Correct all leakage before proceeding with installation connections.

NOTE

Fuel must be free flowing to fuel boost pump. Use fittings listed on page C-2 to connect fuel hoses directly to fuel tank.

(3) *Conditioned air outlet compartment divider panel installation.* Install divider panel and compartment drain hoses (fig. 1-15, sheet 4 of 7) in conditioned air outlet compartment (fig. 1-2) as follows.

(*a*) Remove divider panel from battery access and storage compartment (fig. 1-1) and remove drain hoses secured to bottom of panel.

(*b*) Open conditioned air outlet compartment access door and carefully install panel with cutout in panel corner around heated air line insulated collar in compartment, with left side of panel engaging angle slots in brace on left side of compartment (fig. 4-3). Engage slots in rear edge of panel with hook in wall of compartment. Secure panel to compartment with the three wingstuds.

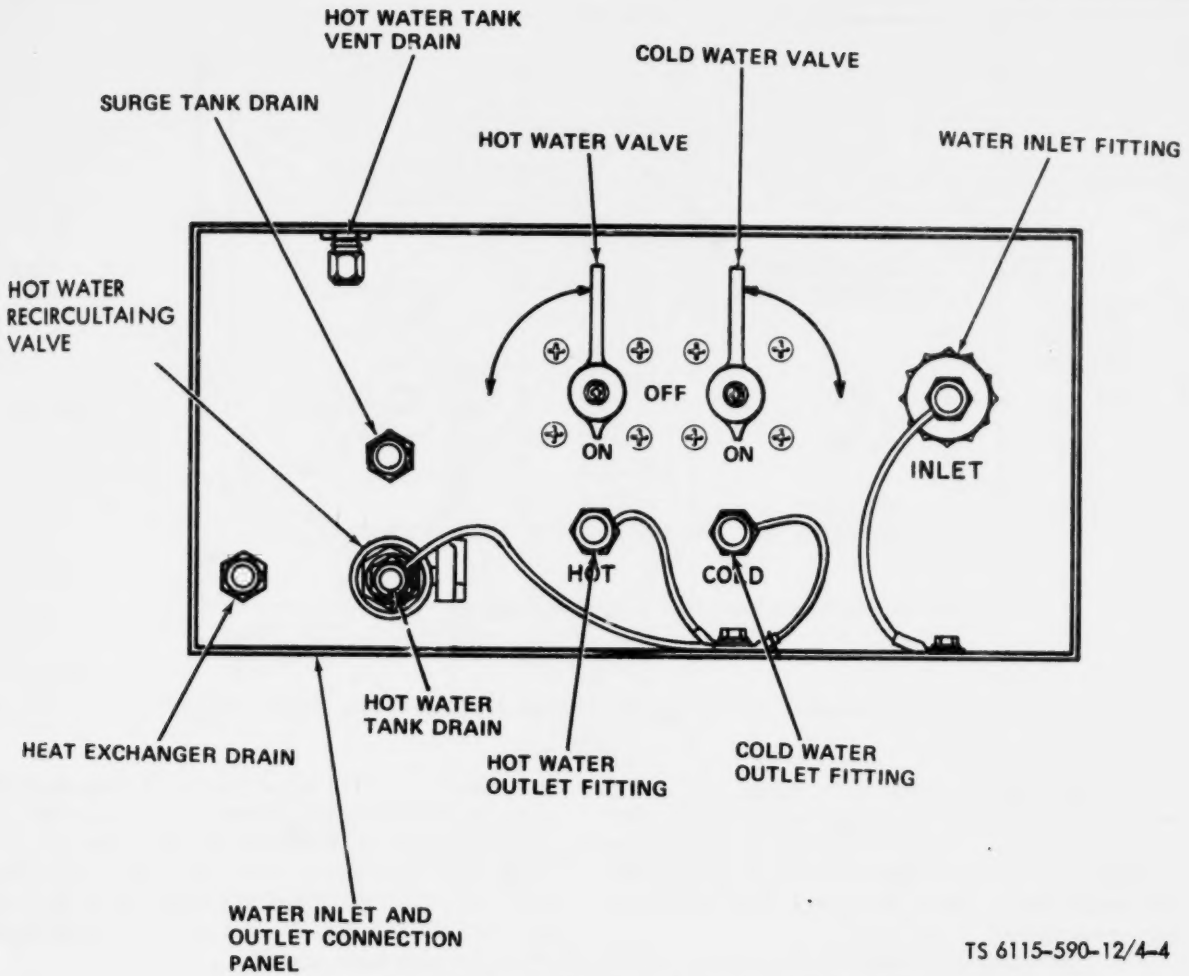


Figure 4-4. Water Inlet and Outlet Connection Panel. (TS 6115-590-12/4-4).

CAUTION

Use care during installation of panel to prevent damage to insulating foam around edge of panel.

(c) Install drain hoses on fittings in bottom f divider panel and insulated collar around heated ir line and position hose behind heated air lines as hown in fig. 4-3.

(4) *External 24V DC auxiliary power source nnections.* If power plant batteries are discharged otherwise inoperative, connect an external 24V C auxiliary power source to the power unit as llows.

(a) If external 24V DC power source has a C take off receptacle, connect external power input ble assembly (fig. 1-15, sheet 1 of 7) to take off eptacle and DC battery slave connection on recep- le panel.

(b) If an external battery or batteries are d, install battery terminal lugs of external DC power cable assembly (fig. 1-15, sheet 1 of 7) on terminals with polarity marks (+ and -) on terminal lugs matched to polarity marks on battery terminals. Connect dc connector on electrical output connection panel.

CAUTION

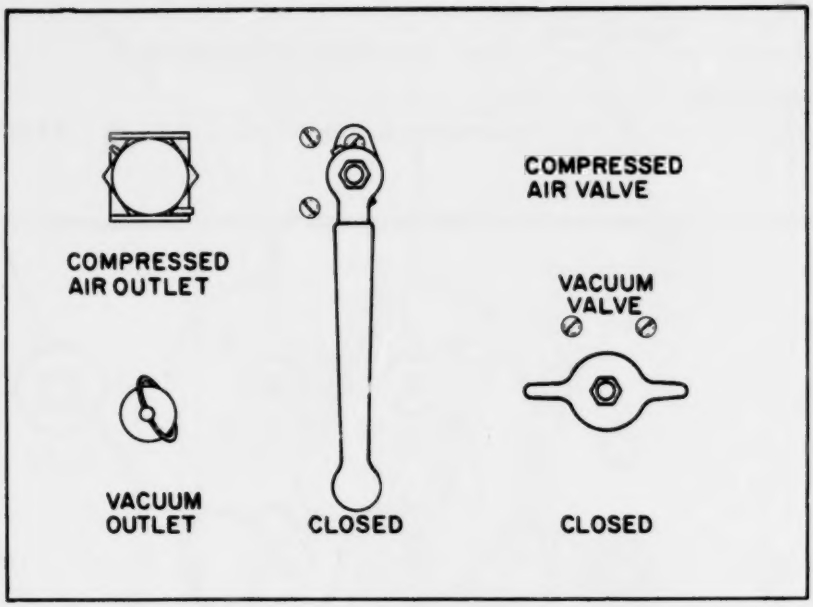
Do not attempt to operate power plant if batteries are not connected.

NOTE

If polarity is reversed between external battery and power plant the reverse polarity indicating lamp will illuminate indicating the condition and the power plant will not start. Reverse cable assembly terminal lugs on battery terminals to correct the condition.

(c) After power plant is started (para 2-10), disconnect external DC power cable assembly.

(5) *Water system connections and priming.* Refer to fig. 4-4 and connect and prime system as follows.



TS 6115-590-12/4-5

Figure 4-5. Compressed Air and Vacuum Connection and Control Panel (TS 6115-590-12/4-5).

(*a*) Remove caps from surge tank, hot water tank, and heat exchanger drains. Open hot water return valve to allow any water in the system to drain, then reinstall caps on drain fittings. Close hot water return valve and check that all other valves are closed.

(*b*) Open air temperature control panel access door (fig. 1-1) and open the hot water tank vent valve (fig. 1-11) on top of the hot water storage tank.

(*c*) Connect a source of potable water to the water inlet fitting utilizing the water supply and drain hose (fig. 1-15, Sheet 3 of 7).

CAUTION

Be sure water supply and drain hose is not kinked, collapsed, or otherwise positioned to restrict water flow.

(*d*) Connect a water hose to cold water outlet fitting (fig. 4-4) and arrange hose to drain to a convenient place.

(*e*) Start gas turbine engine (para 2-10) and place 400 Hz system main contactor switch in CLOSED position.

(*f*) Place hot water pump and cold water pump switches on instrument panel to the ON position.

(*g*) Place cold water valve (fig. 4-4) in OPEN position and observe water flow from hose attached to cold water outlet fitting. Observe cold water outlet and hot water tank vent drain for continuous flow of water. When a continuous flow of water is observed from cold water outlet and hot water tank vent drain, close hot water tank vent valve (fig. 1-11) and place cold water valve (fig. 4-4) in CLOSED position. The hot water and cold water system is now fully primed.

NOTE

In the event the water system fails to prime, continue with steps (h) and (i). Otherwise go to step (j).

(*h*) Connect the vacuum hose to the vacuum outlet on the power. Move the vacuum lever to the ON position.

(*i*) Open the cold water outlet hand valve and place the vacuum hose over the water outlet momentarily. Repeat this procedure until full pressurized water flow is observed at the cold water outlet valve. The system is now primed.

(*j*) Connect dual water hose assembly (fig. 1-15, sheet 3 of 7) to hot water and cold water outlet fittings (fig. 4-4).

NOTE

If possible freezing conditons are anticipated connect electrical connectors on supply and drain water hose assembly (fig. 1-15, sheet 3 of 7) and dual water hose assembly to water line heater connectors on receptacle panel (fig. 2-9). Connect electrical connectors on water recirculating hose assembly to connectors on the shelter. Position and protect hose assemblies to prevent kinks, collapse, and damage from traffic.

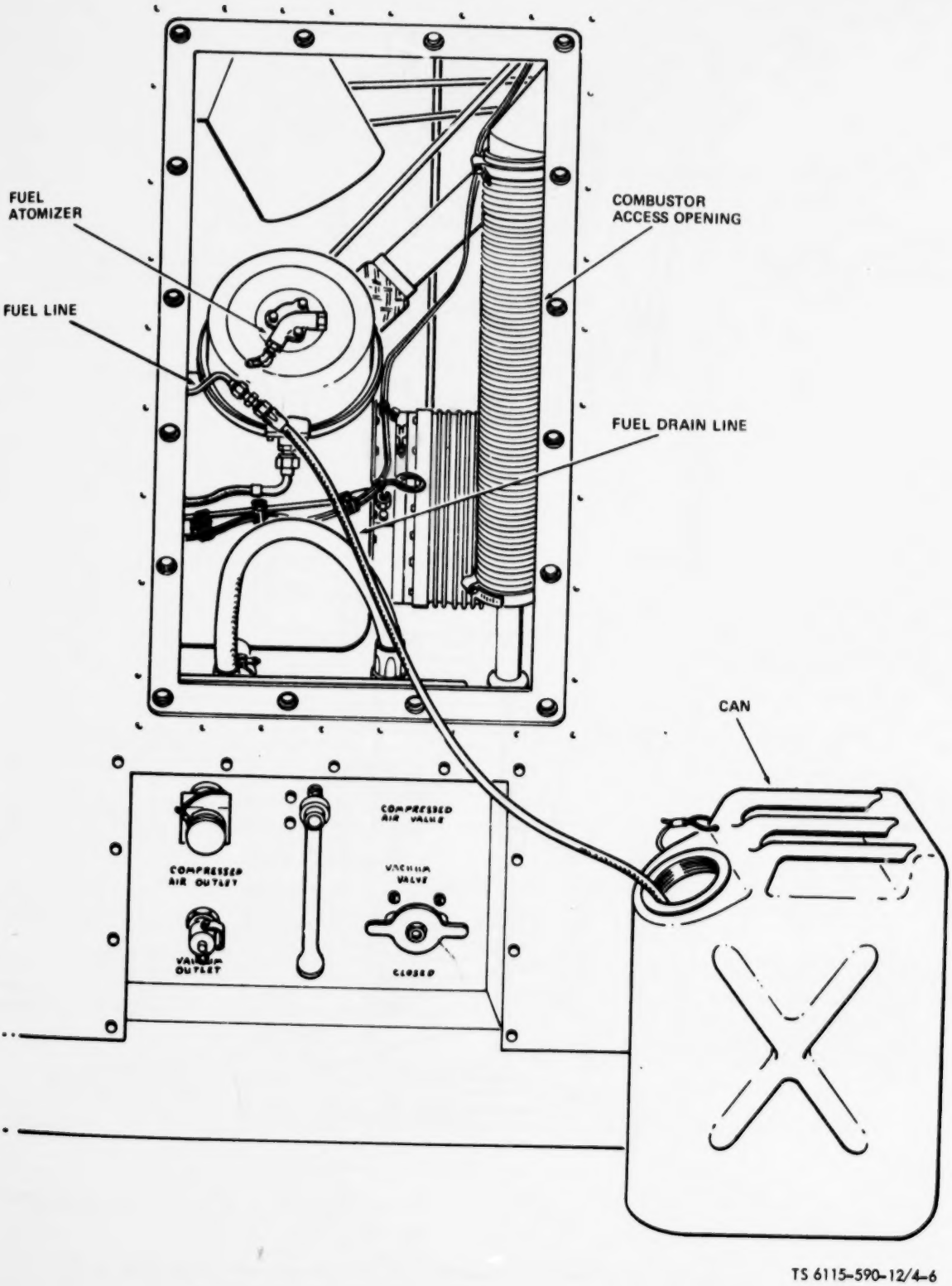
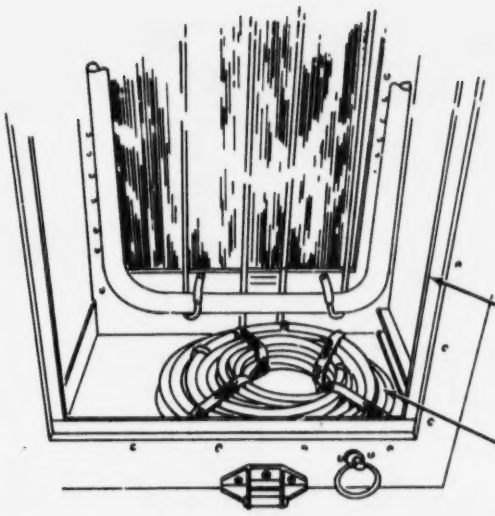


Figure 4-6. Depreservation of Fuel System. (TS 6115-590-12/4-6).

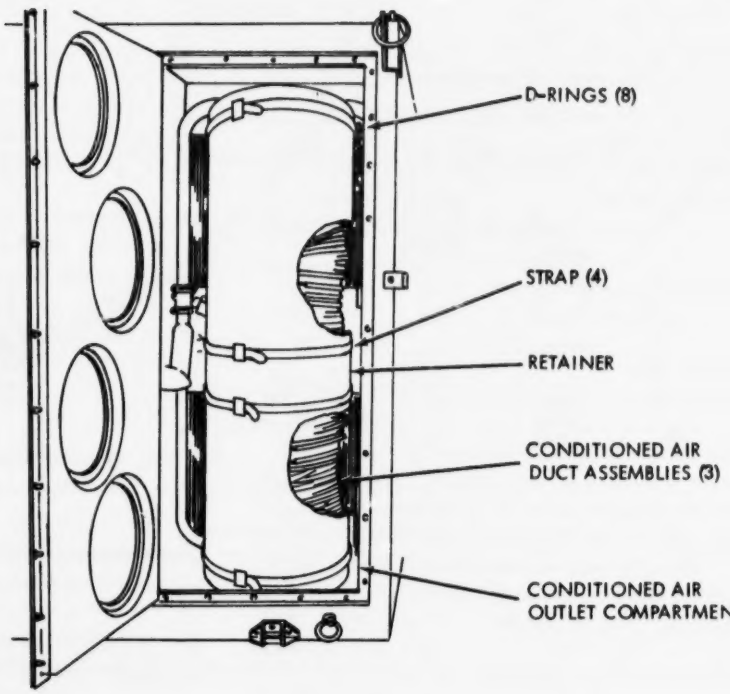
STEP 1
STOW DUAL WATER HOSE ASSEMBLY ON FLOOR



STEP 2
SNAP RETAINER TO D-RINGS ON RIGHT SIDE , 4 PLACES

STEP 3
STACK 3 CONDITIONED AIR DUCT ASSEMBLIES AS SHOWN

STEP 4
WRAP RETAINER OVER DUCT ASSEMBLIES AND RUN STRAPS THRU 4 D-RINGS ON LEFT SIDE AND BACK THRU BUCKLE TO CINCH



TS 6115-590-

Figure 4-7. Stowing Accessory Components in Conditioned Air Outlet Compartment. (TS 6115-590-12/4-7).

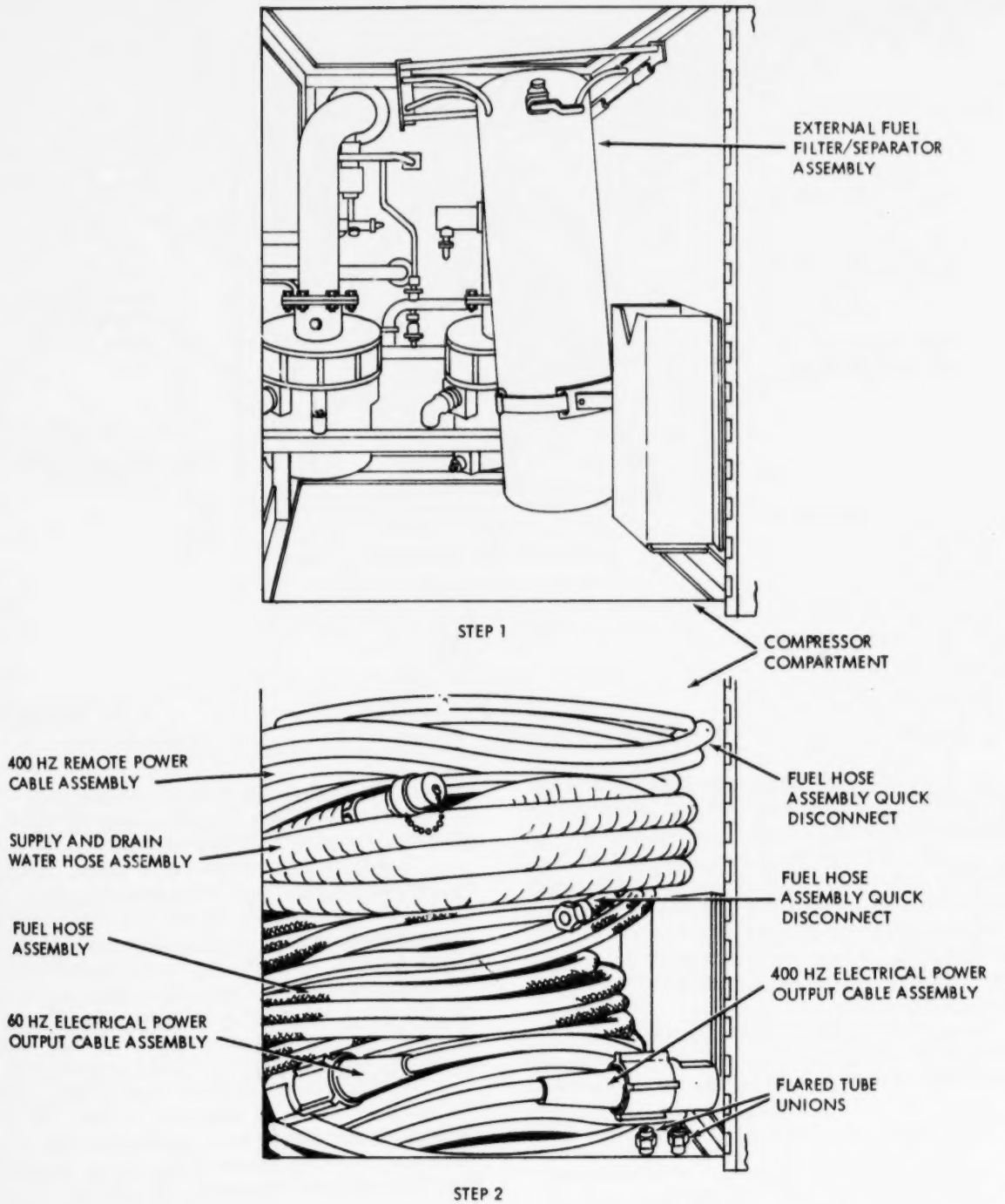

EXTERNAL FUEL FILTER/SEPARATOR ASSEMBLY
STEP 1
COMPRESSOR COMPARTMENT
400 HZ REMOTE POWER CABLE ASSEMBLY
SUPPLY AND DRAIN WATER HOSE ASSEMBLY
FUEL HOSE ASSEMBLY
60 HZ ELECTRICAL POWER OUTPUT CABLE ASSEMBLY
FUEL HOSE ASSEMBLY QUICK DISCONNECT
FUEL HOSE ASSEMBLY QUICK DISCONNECT
400 HZ ELECTRICAL POWER OUTPUT CABLE ASSEMBLY
FLARED TUBE UNIONS
STEP 2
TS 6115-590-12/4-8

Figure 4-8. Stowing Accessory Components in Refrigeration Compressor Compartment. (TS 6115-590-12/4-8).

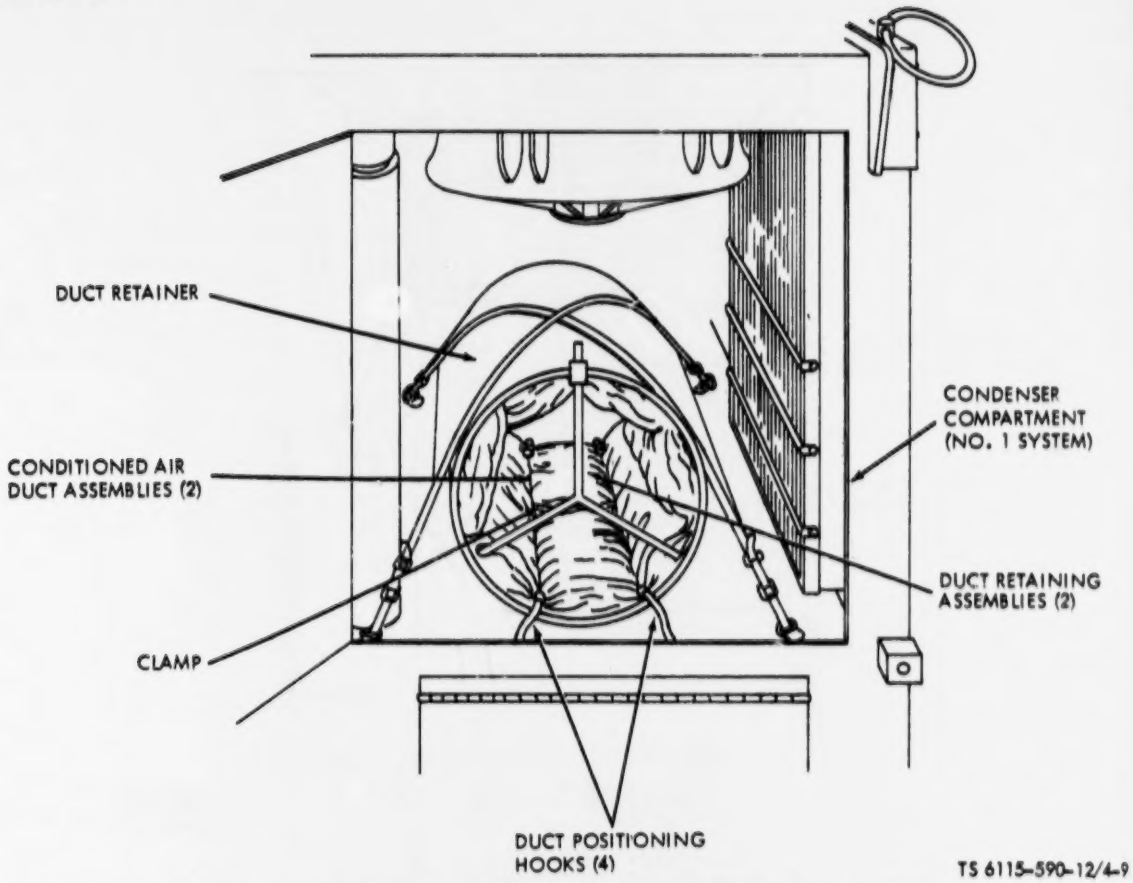


Figure 4-9. Stowing Accessory Components in Condenser Compartment (No. 1 System). (TS 6115-590-12/4-9).

(*k*) Place hot water valve (fig. 4-4) and cold water valve in OPEN position and connect dual water hose assembly to point of water use.

(*l*) Connect one water recirculating hose assembly (fig. 1-15, sheet 6 of 7) to hot water return fitting (fig. 4-4) on the power unit and to the return at point of water use. Connect the other water recirculating hose between the return at point of water use and the water source on the power unit for circulation of cold water.

(*m*) Place hot and cold water valves and hot water return valve in OPEN position. Hot and cold water delivery may now be taken at point of use.

NOTE

Check all outlet valves at point of water use to insure that they are closed before opening valves on power plant. Approximately 15 minutes should elapse before attempting hot water use to permit water to be heated.

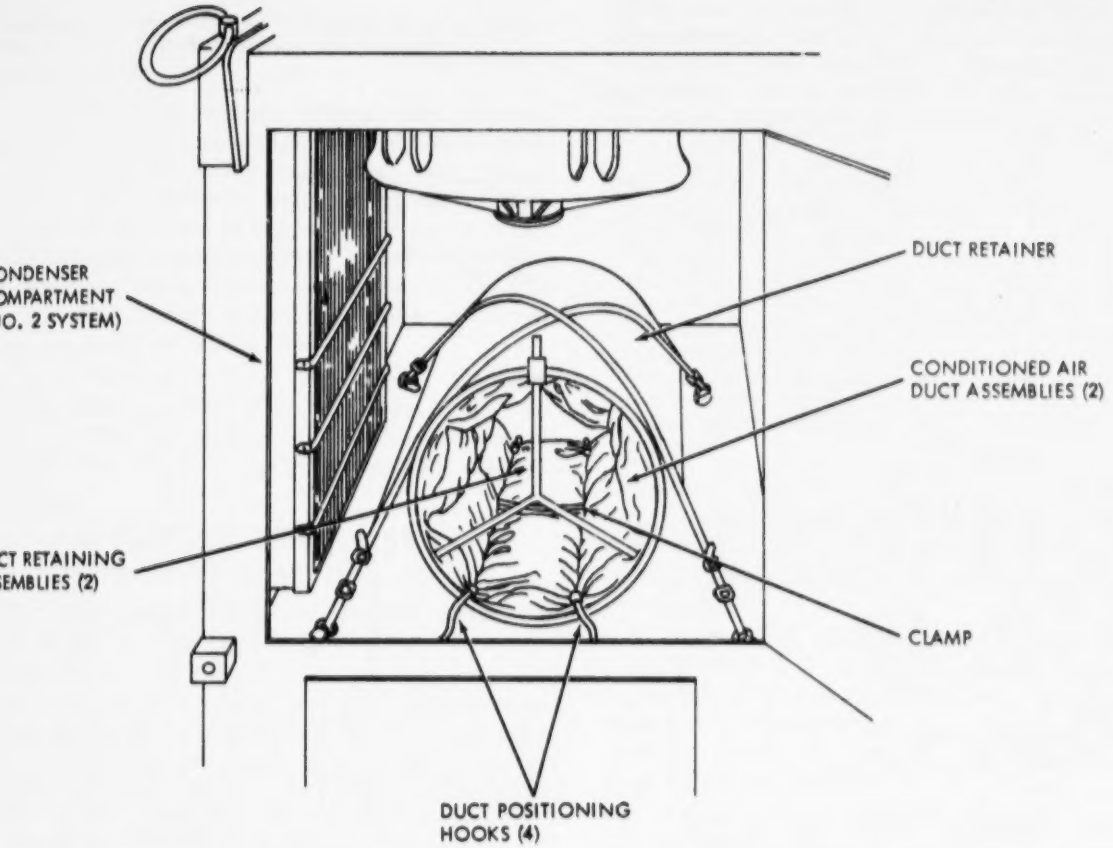
(6) *60 Hz power output connections.* Use 60 Hz electrical power output cable assembly (fig. 1-15, sheet 2 of 7) to connect between the 60 Hz power output receptacle (fig. 2-9) and other elements of the MUST hospital. Two 60 Hz convenience receptacles (fig. 2-9) are also included on the receptacle panel to provide 60 Hz power for external requirements. The convenience receptacles will accommodate a standard three-prong, twist-lock plug.

(7) *400 Hz power output connections.* Use 400 Hz electrical power output cable assembly (fig. 1-15, sheet 2 of 7) to connect between the 400 Hz power output receptacle (fig. 2-9) and other elements of the MUST hospital. Two 400 Hz convenience receptacles are also included on the receptacle panel to provide 400 Hz power for external requirements. The convenience receptacles accommodate standard three-prong, twist-lock plugs or parallel U-ground plugs.

(8) *400 Hz auxiliary power connections.* If 400 Hz auxiliary power is required, connect 400 Hz electrical power output cable assemblies (fig. 1-15, sheet 2 of 7) to 400 Hz auxiliary power receptacle (fig. 2-9) and to 400 Hz power requirement.

NOTE

Conditioned air systems and auxiliary 400 Hz power outputs are interlocked to avoid overload of the 400 Hz system. If one auxiliary 400 Hz output is in use only one of the conditioned air systems will operate. If both auxiliary 400 Hz systems are in use, neither conditioned air system will operate.



TS 6115-590-12/4-10

Figure 4-10. Stowing Accessory Components in Condenser Compartment (No. 2 System). (TS 6115-590-12/4-10).

(9) ***Remote fan operation connections.*** If the rculating fans in a nonoperating power plant are operated, connect 400 Hz auxiliary power cable mbly (fig. 1-15, sheet 2 of 7) to remote fan power ut connector (fig. 2-9) and to remote fan power t connector on the nonoperating unit. The te operation cable adapter (fig. 1-15, sheet 7 of ay be used to join two 400 Hz remote power assemblies together to obtain additional h. Recirculating fans in two non-operating may be powered from the operating unit ded the cooled air system in the operating unit t being used.

10) ***Conditioned air system connections.*** ve duct retaining assemblies from collapsed itioned air duct assemblies. Extend duct blies and inspect for abrasions, holes, or other ge. Connect duct assemblies as follows.

CAUTION

ndle duct assemblies with care to avoid dam- to fabric.

(*a*) Remove covers from return air inlets (fig. 1-1). Connect return air duct assemblies to return air inlet of power plant using clamps provided with duct assemblies. Connect other end to return air outlet of shelter. Use conditioned air duct coupling clamps (fig. 1-15, sheet 4 of 7) as required to connect two or more duct assemblies for additional length.

(*b*) Remove covers from conditioned air outlets (fig. 1-2). Connect conditioned air duct assemblies (fig. 1-15, sheet 4 of 7) to conditioned air outlets using clamps provided with duct assembly. Connect other end of duct to conditioned air inlet of shelters. Use conditioned air duct coupling clamps (fig. 1-15, sheet 4 of 7), as required, to connect two or more duct assemblies for additional length.

CAUTION

Because there are two independent conditioned air systems, be sure that the outlet air ducts and return air ducts for each shelter serviced are connected to the corresponding system at the unit so that conditioned air and return air will be going through the same system.

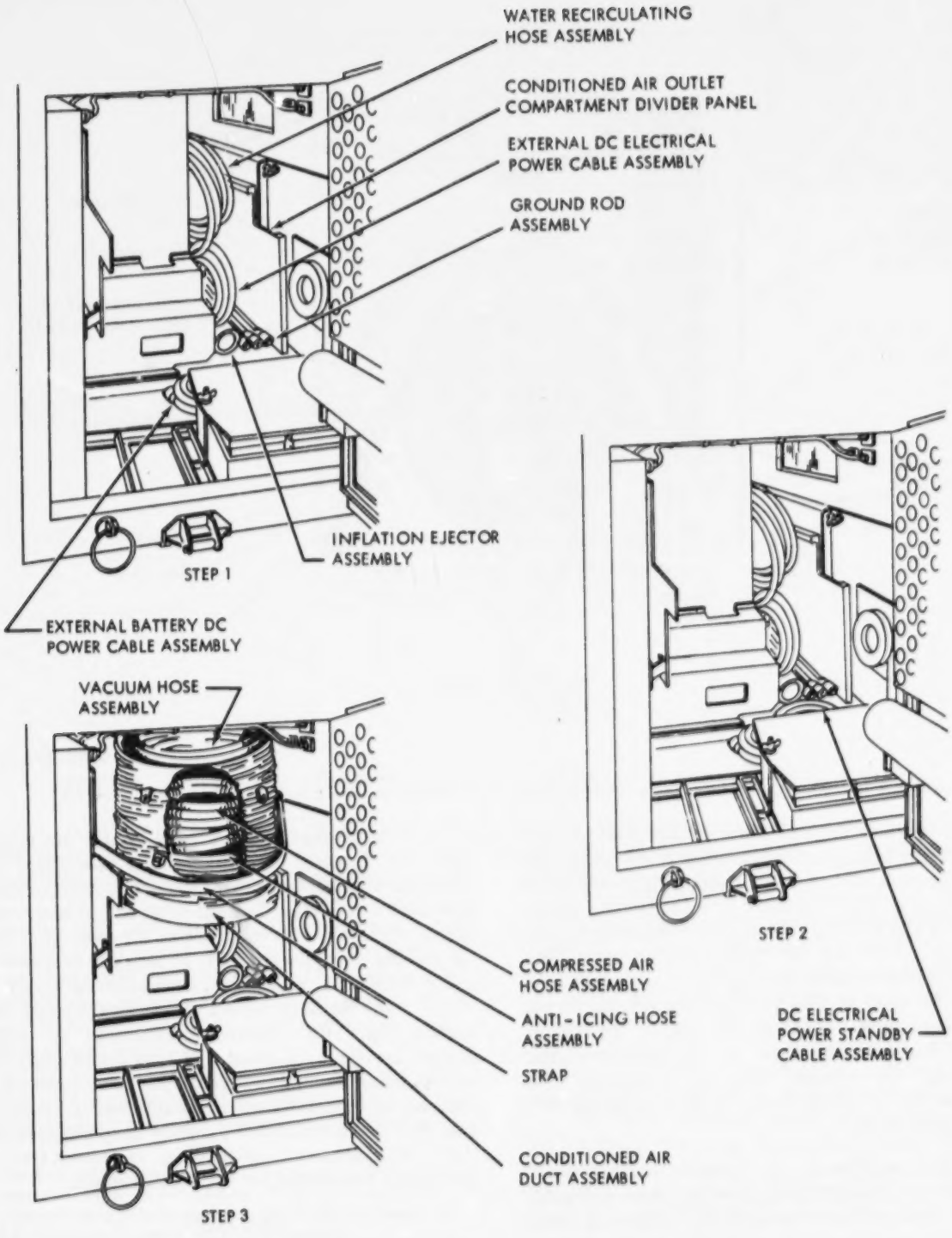


Figure 4-11. Stowing Accessory Components in Battery Access and Storage Compartment. (TS 6115-590-12/4-11).

NOTE

Condenser air inlet panels and condenser air outlet doors (fig. 1-1 and 1-2) must be opened before operation of the cooled air system.

(11) *Bleed air system connections.* Connect compressed air hose assembly (fig. 1-15, sheet 3 of 7) to compressed air outlet fitting (fig. 4-5). Install inflation ejector assembly (fig. 1-15, sheet 3 of 7) to the inflation manifold on the inflatable shelter of the MUST hospital. Connect delivery end of compressed air hose assembly to ejector assembly for inflation of the inflatable shelter. A hose is available to furnish bleed air to the air intake filter deicer.

(12) *Vacuum system connection.* Connect vacuum hose assembly (fig. 1-15, sheet 4 of 7) to vacuum outlet fitting (fig. 4-5). Connect other end of vacuum hose assembly to shelter requiring vacuum service.

4-3. Fuel and Lubrication System Depreservation and Servicing

The fuel and lubrication system must be depreserved and serviced by organizational maintenance personnel as follows:

a. Open oil tank access door (fig. 1-1), remove filler cap and dipstick from oil tank and fill oil tank with oil as specified, rather to Lubrication Order, LO5-6115-590-12. Allow time for oil level to recede as air is vented, then add oil until level remains at FULL mark on dipstick. Reinstall oil tank filler cap and dipstick.

b. Connect external fuel system filter separator assembly to fuel inlet fitting as shown in figure 4-2. Connect fuel hose assembly between fuel supply and filter assembly. Check fuel lines and filter assembly for leakage. Make sure that an adequate supply of the correct fuel is available for the anticipated operating period.

NOTE

For initial operation or at any time the no fuel indicator lamp is illuminated, it will be necessary to purge air from the fuel float tank to allow the fuel level to overcome the fuel float switch before the unit will start. After connecting the external fuel source hold the fuel boost pump switch ON for a few seconds to fill the fuel tank then open the oil tank access door and press the button on the fuel float tank vent valve until fuel flows from the drain tube at the oil tank spill drain (beneath the oil tank fill); then release button. The no fuel indicator lamp should now be extinguished and the power plant can be started by normal procedure.

c. Remove engine combustor access panel (fig. 1-2). Disconnect fuel line from fuel atomizer and connect a line to drain overboard into a suitable container (fig. 4-6). Do not drain fuel onto the ground.

d. Momentarily place the master switch on the instrument panel to the START position. Motor the engine by starter motor action for 10 to 15 seconds to allow fuel to discharge from the overboard drain line until you have a good flow into the container, then place master switch to the STOP position.

e. Disconnect and remove overboard drain line and reconnect engine fuel line to the fuel atomizer and check for oil and fuel leaks. If no leaks are present, reinstall engine combustor access panel (fig. 1-2).

Section II. Movement to a New Worksite

4-4. Dismantling for Movement

a. Disconnection of Accessory Components.

(1) Disconnect all electrical cable assemblies from receptacle panel and remote power panel (fig. 2-9) and from shelters. Coil cable assemblies and secure ends for stowage. Remove ground wire from electrical system ground terminal E2. Close or install all protective covers on connectors of receptacle panel and remote power panel. Attempt to remove ground rod.

(2) Disconnect all conditioned air duct assemblies from return air inlets (fig. 1-1) and conditioned air outlets (fig. 1-2). Install covers over air inlets and outlets, secure covers with clamps. Visually inspect duct assemblies for abrasions, holes, or other damage. Separate conditioned air duct assemblies from conditioned air duct coupling assemblies. Collapse duct assemblies and secure in the collapsed position with duct retaining assemblies.

CAUTION

Handle conditioned air duct assemblies with care to avoid damage to fabric.

(3) Close hot and cold water, and hot water recirculating valves (fig. 4-4). Disconnect dual water hose assembly, and water recirculating hose from water inlet and outlet connection panel, and from water supply and discharge points. Drain hose assemblies. Coil hose assemblies and secure ends for stowage. Drain power plant water system as follows.

(*a*) Remove drain caps from hot water tank vent drain, heat exchanger drain, and surge tank drain. Open the hot water recirculating valve and the hot and cold water outlet valves. Open the hot water tank vent valve (fig. 1-11) until all water has drained from system, then close vent valve.

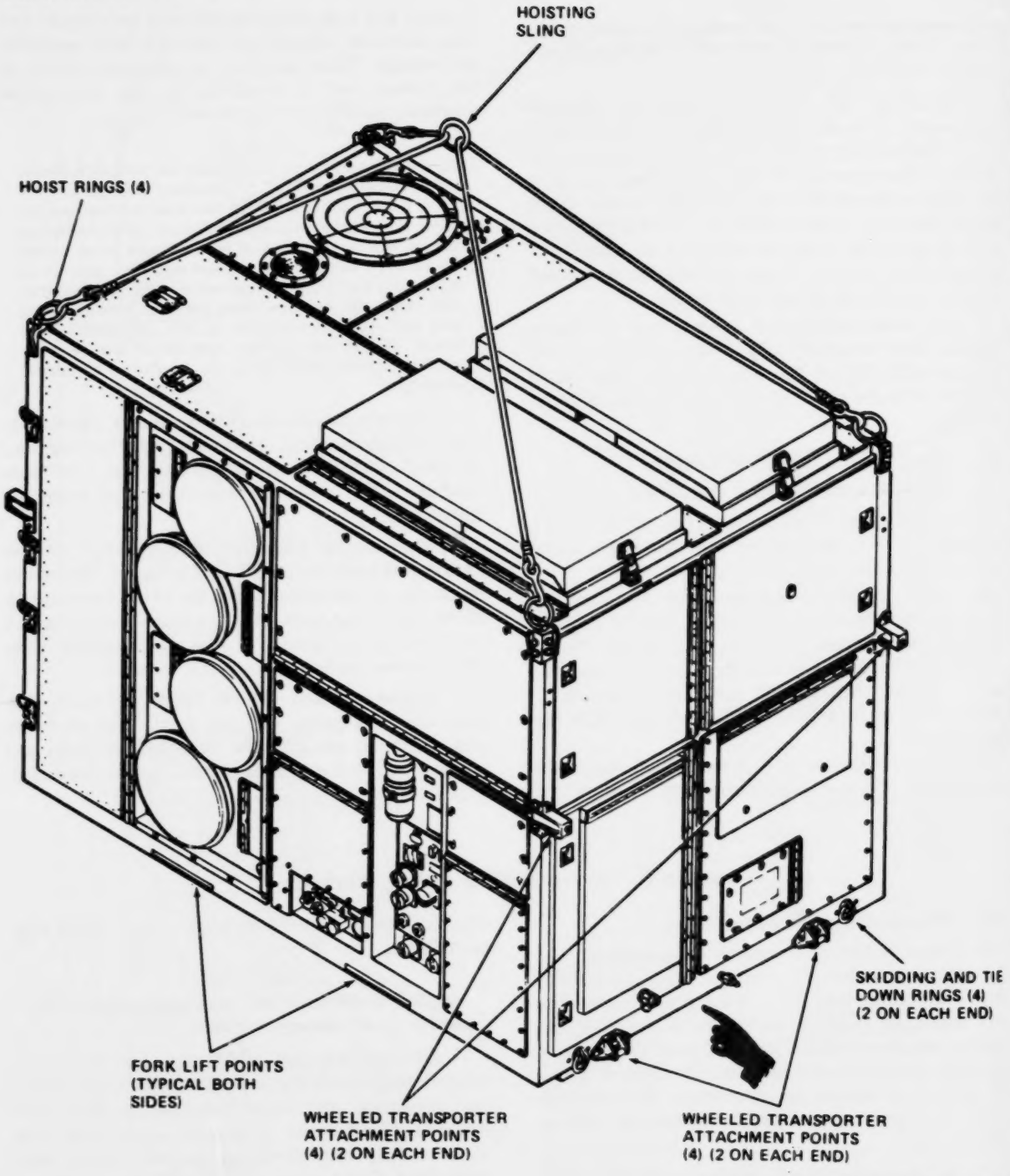

HOISTING SLING
HOIST RINGS (4)
SKIDDING AND TIE DOWN RINGS (4) (2 ON EACH END)
FORK LIFT POINTS (TYPICAL BOTH SIDES)
WHEELED TRANSPORTER ATTACHMENT POINTS (4) (2 ON EACH END)
WHEELED TRANSPORTER ATTACHMENT POINTS (4) (2 ON EACH END)
TS 6115-590-12/4-12

Figure 4-12. Power Plant Handling and Transport Attaching Points. (TS 6115-590-12/4-12).

(*b*) Connect compressed air hose assembly (fig. 1-15, sheet 3 of 7) to compressed air outlet fitting (fig. 4-5). Hold discharge end of air hose assembly against cold water outlet fitting (fig. 4-4). Start engine (para. 2-10) and open compressed air valve (fig. 4-5) approximately 20 to 30 degrees to deliver a small flow of compressed air into water system to purge residual water.

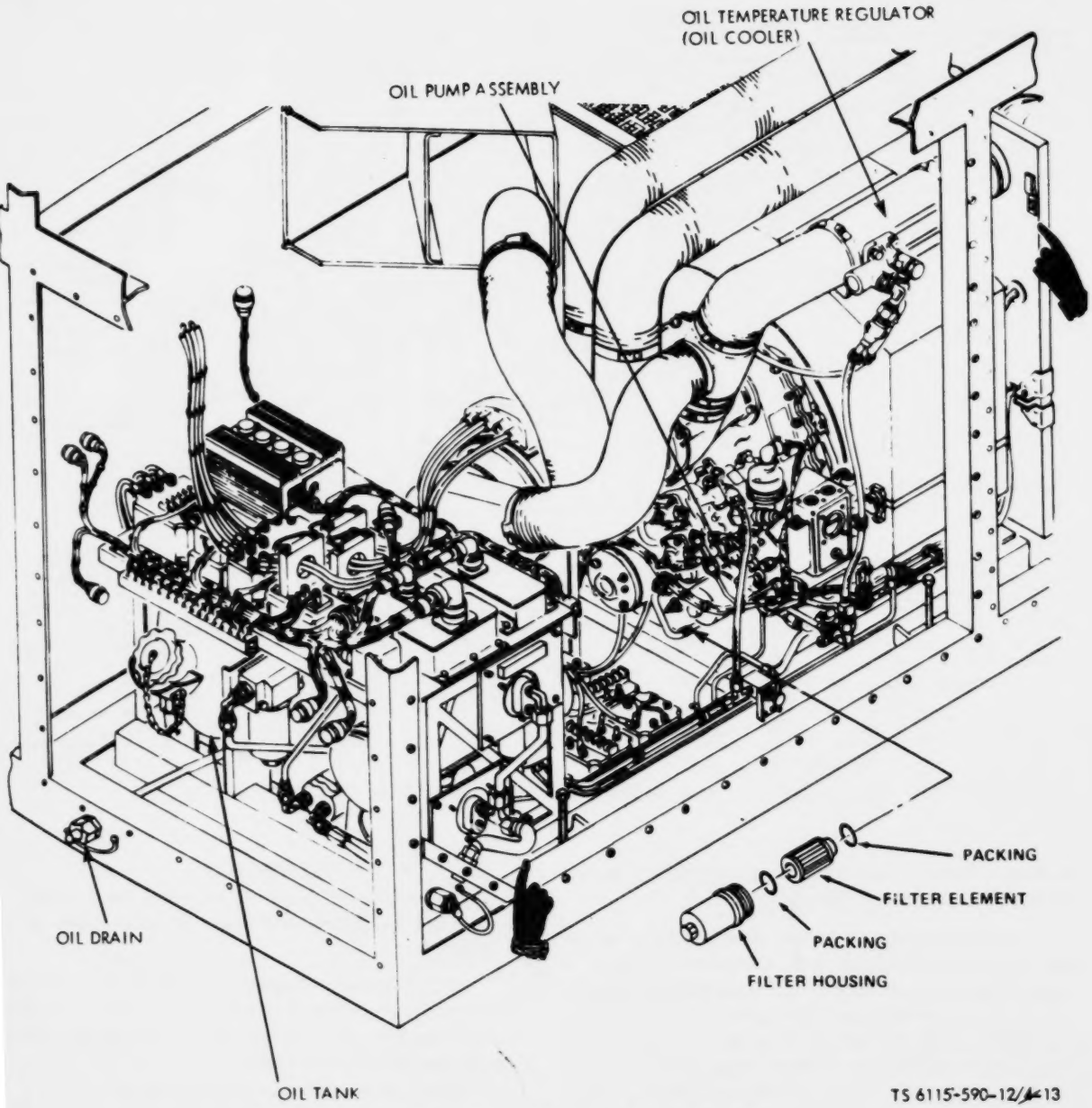


Figure 4-13. Oil Filter Element Removal. (TS 6115-590-12 4-13)

CAUTION

Observe water system tank and plumbing for excessive heating due to purge air. If external temperature of water system components approaches safe touch temperature [160°F maximum), decrease compressed air flow, or shut off air flow completely until system cools. Excessive temperatures will damage the pump and valve seals.

(c) When all water has been purged, note hich water connection is discharging maximum amount of air, then close that connection. Continue to close connections discharging the maximum amount of air until only one connection remains open, then shut off compressed air, remove air hose assembly from cold water outlet fitting (fig. 4-4). Shut down engine (fig. 2-12). Disconnect compressed air hose assembly from compressed air outlet fitting, coil hose assembly, and secure ends for stowage.

(4) Close vacuum control valve (fig. 4-5). Disconnect vacuum hose assembly from vacuum outlet fitting, coil hose assembly, and secure ends for

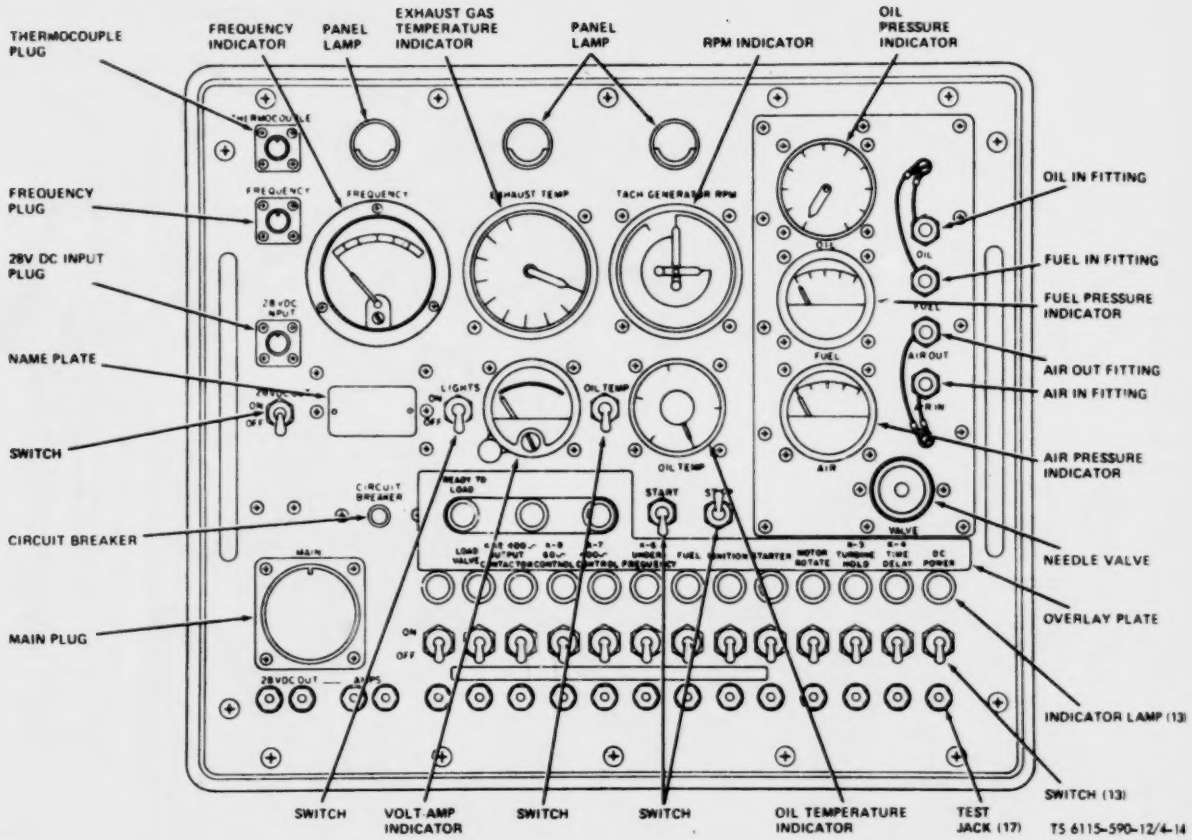


Figure 4-14. Gas Turbine Engine Analyzer with Overlay Plate. (TS 6115-590-12/4-14).

stowage. Install protective caps on vacuum outlet fitting and compressed air outlet fitting.

(5) Close inlet and outlet valves on the external fuel filter/separator (fig. 4-2). Disconnect fuel hose assemblies from fuel supply and from inlet and outlet connections on filter/separator. Drain hose assemblies, coil, and secure ends for stowage. Open the ½ inch water valve to drain water and fuel from the filter/separator. Open the manual pressure vent valve on top of cover. When water and fuel have drained, close water drain valve and vent valve. Install dust plug on inlet opening and dust cap on outlet opening. Install protective cap on power unit inlet fitting.

(6) Close and secure both condenser air inlet panels (fig. 1-1), condenser air outlet doors (fig. 1-1 and 1-2), and make up air doors (fig. 1-1).

(7) Loosen clamp attaching drain hose to bottom of separator panel and disconnect hose. Loosen three wingstuds (fig. 4-3) and carefully remove divider panel from conditioned air outlet compartment.

CAUTION

Use care during removal of panel to prevent damage to insulating foam around edge of panel.

(8) Remove wingnuts (fig. 4-1) securing battery cover and remove cover. Disconnect battery cable lugs from battery terminals. Reinstall battery cover and secure wingnuts.

b. Stowage of Accessory Components.

(1) Stow dual water hose assembly, three conditioned air duct assemblies, and two conditioned air duct coupling clamps in conditioned air outlet compartment as shown in fig. 4-7. Secure stacked duct assemblies with straps.

(2) Stow external fuel system filter assembly, 400 Hz electrical power cable assembly. 60 Hz electrical power cable assembly, three fuel hose assemblies, supply and drain water hose assembly, 400 Hz remote power assembly and two flared tube unions in refrigeration compressors compartment as shown in fig. 4-8.

(3) Stow two conditioned air duct assemblies, and one conditioned air duct coupling clamp in con-

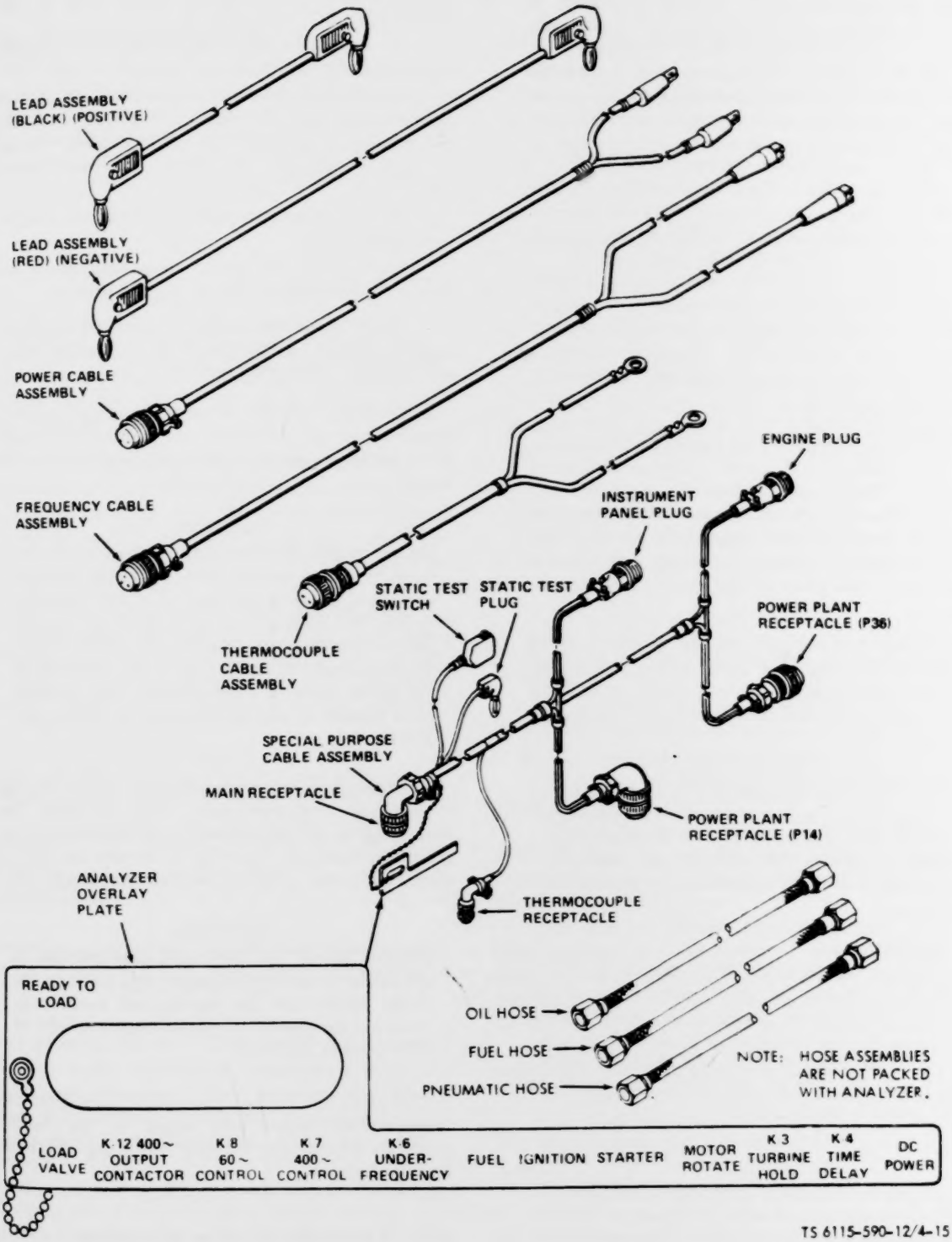


Figure 4-15. Analyzer Cables and Special Purpose Cable Assembly. (TS 6115-590-12/4-15).

denser compartment (no. 1 system) as shown in figure 4-9. Secure duct assemblies with positioning hooks to prevent movement during transport.

(4) Stow two conditioned air duct assemblies and one conditioned air duct coupling clamp in condenser compartment (no. 2 system) as shown in figure 4-10. Secure duct assemblies with positioning hooks to prevent movement during transport.

(5) Stow inflation ejector assembly, conditioned air outlet compartment divider panel, external DC electrical power input cable assembly, external battery DC power cable assembly, vacuum hose assembly, electrical DC power standby cable assembly, compressed air hose assembly, one water recirculation hose assembly, one conditioned air duct assembly and one anti-icing hose assembly in battery access and storage compartment as shown in figure 4-11.

c. Final Procedures.

(1) Close and secure all panels and doors.

(2) Close or install protective covers or caps on connection fittings and receptacles. Install covers.

(3) If power plant is to be handled or loaded by hoisting, install sling on hoist rings at corners of power plant as shown in figure 4-12.

d. Hoisting.

Attach hoisting sling to the power plant as shown on the lifting data plate. Use a crane, helicopter or other hoisting device capable of lifting a minimum of 5000 pounds and hoist to the desired location.

WARNING

Do not use lifting equipment with a capacity of less than 5000 pounds. Do not allow power plant to swing back and forth when it is suspended. Failure to observe this warning may result in severe injury or death to personnel or damage to equipment.

e. Fork Lifting.

Position the fork lift (5000 pound minimum capacity) at the fork lift points designated on the power plant and shown in fig. 4-12 and lift power plant for loading or transport over short distances. Use fork extensions of sufficient length to extend the forks of the lift thru the power plant skids.

WARNING

Do not use fork lift with capacity of less than 5000 pounds. Do not allow power plant to rock excessively on fork lift. Failure to observe this warning may result in severe injury or death to personnel or damage to equipment.

f. Wheeled Transporter. Attach wheeled transporter or mobilizer to power plant. Refer to TM 9-2330-275-14.

(1) Separate transporter sections and prepare transporter for use.

(2) Position transporter sections at end of power unit adjacent to wheeled transporter attachment points (fig. 4-12) at ends of power plant. Connect transporter to power unit attachment points.

(3) Operate transporter to raise power unit to towing height.

(4) Use approved towing equipment or manually move power unit to desired position.

(5) When power unit is in desired position, operate transporter to lower power unit. Disconnect and remove transporter section.

g. Skidding. Attach a cable or chain sling to skidding and tie down rings (fig. 4-12) and connect to suitable equipment for skidding to desired location.

CAUTION

Do not attach skidding sling to skidding equipment in such a manner that the angle between any leg of the sling and the end of the container is less than 45 degrees. Any angle less than 45 degrees will cause an excessive side strain which could damage the power unit. Limit skidding of the power plant to short distance over smooth level terrain to prevent damage to power unit skids.

h. Shipment. The power unit may be transported by airplane, helicopter, ship, truck, or train. The various tie down and hoisting rings identified on the power unit and shown in fig. 4-12 may be used to secure the power plant to the transport equipment.

CAUTION

Position power unit with skid base parallel to the carrier to prevent excessive side loads on the skids. Make sure the carrier and restraining methods are capable of supporting a weight of 5000 pounds minimum.

i. Unloading. Unload the power plant from the transport equipment and locate in the desired position using any of the handling methods described above.

4-5. Reinstallation After Movement

Refer to paragraph 4-1 and 4-2 and reinstall the power plant.

Section III. Repair Parts, Special Tools and Equipment

6. Tools and Equipment

Tools and equipment issued with or authorized for e with the power plant are listed in the Basic Issue ems List and Items Troop Installed or Authorized ist, and Repair Parts and Special Tools List TM 6115-590-20P.

4-7. Special Tools and Equipment

The special tools and equipment required to perform organizational maintenance on the power plant are listed in TM 5-6115-590-20P.

4-8. Maintenance Repair Parts

Repair parts, special tools, test and support equipment for organizational maintenance are listed and illustrated in TM 5-6115-590-20P.

Section IV. Lubrication Instructions

9. General Lubrication Information

This section contains lubrication instructions hich are supplemental to, and not specifically vered, in the lubrication order. Refer to LO 6115-590-12.

10. Detailed Lubrication Information

a. General. Keep all lubricants in closed contains and store in clean, dry place away from extreme at. Allow no dust, dirt, or other foreign material to x with lubricants. Keep all lubrication equipment an and ready to use.

b. Cleaning. Keep all external parts not requiring brication clean of lubricants. Before lubricating uipment, wipe all lubrication points free of dirt d grease. Clean all lubrication points after lubriting to prevent accumulation of foreign matter.

c. Changing Oil.

NOTE

Drain oil while engine is still hot from operation. If necessary, start and operate engine until oil is hot.

(1) Open oil tank access door (fig. 1-1). Loosen tank filter cap and dipstick to vent tank and facilte draining. Remove oil drain cap and allow oil to in completely.

NOTE

spect drained oil for metal particles which might indicate ternal damage to engine. Notify direct support maintnance if oil contains metal particles.

WARNING

ry cleaning solvent P-D-680 or P-S-661 used clean parts is potentially dangerous to personnel and property. Avoid repeated and prolnged skin contact. Do not use near open flame excessive heat. Flash point of solvent is 100 egrees F. (38°C.)

(2) Remove engine and skid access panel (fig. . Remove oil filter housing, filter element, and kings from oil pump assembly (fig. 4-13). Clean filter housing with dry cleaning solvent Fed. c. P-D-680 and dry thoroughly.

(3) Install new filter element, new packings, cleaned oil filter housing on oil pump housing.

(4) Install oil drain cap. Remove filler cap and dipstick from oil tank and fill oil tank with specified lubricating oil until dipstick indicates FULL. Allow time for oil level to recede as air is vented, then add oil until level remains at FULL mark on dipstick. Reinstall oil tank filler cap and dipstick.

CAUTION

Do not mix types of oils or oils with different specifications. If changing from one type of oil or one oil specification to another, flush lubrication system as described in paragraph d. below.

NOTE

Oil level must be checked and oil replenished as required after engine has been started and operated sufficiently to circulate oil.

(5) Reinstall engine and skid access panel (fig. 1-2). Close and secure oil tank access door (fig. 1-1).

d. Flushing Lubrication System.

(1) Drain oil and change filter as described in steps c.(1), (2), (3), above.

(2) Disconnect plumbing lines from oil pump assembly and from oil tank assembly to oil temperature regulator (oil cooler) and allow oil to drain completely from lines.

(3) Remove oil hose assemblies from oil temperature regulator valve, drain hoses of residual oil and discard packing. Loosen attaching clamps and remove ducts from oil cooler and remove cooler from its cradle. Drain residual oil from cooler tubes.

(4) Reinstall oil temperature regulator and cooler and reconnect plumbing lines.

(5) Fill oil tank as described in step c(4) above.

(6) Start engine and allow to operate at no load for approximately five minutes, then shut the engine down.

(7) Repeat steps d(1) through (5) above.

(8) Start engine and allow to operate at no load for approximately five minutes, then shut engine down.

(9) Replace oil filter element as described in steps c(2) and (3).

(10) Check oil level and replenish as required.

Table 4-1. Organizational Preventive Maintenance Checks and Services

W--Weekly (40 Hours) S--Semiannual (500 hours)
M--Monthly (100 Hours) H--Hours (As Indicated)

Item No.	Interval W	M	S	H	Item to be Inspected	Procedures	Equipment Will Be Reported Not Ready (RED) If:
1		•			Fluid levels	NOTE When access compartments are opened for inspection or servicing, observe compartment interior wiring, tubing, insulation and components for damage, corrosion, leaks or accumulation of foreign material. Insure compartment drains are open and free of obstructions.	
					a. Oil tank	Refill oil tank to full (Fig. 1-1). NOTE It is abnormal for the turbine engine to consume oil without an aparent leak.	
					b. Batteries	Refill electrolyte levels to 3/8 inch above plates and remove corrosion (Fig. 4-1). WARNING When fans are operating, hands, fingers, clothing or loose material may be drawn into the fans resulting in injuries to personnel or equipment.	
					c. Receiver tanks	Check refrigerant levels with system operating in maximum cooling (cooling indicator lamp on). Check glass in sight gage bottom of receiver tank. If glass appears completely dark, sufficient refrigerant is present. If glass has any appearance of shininess, notify direct support maintenance (Fig. 1-8).	
2		•			Conditioned air systems	NOTE Traces of oil at plumbing connection could be an indication of a refrigerant leak.	
					a. Return air filters	Clean and check for damage, corrosion, or accumulation of foreign material.	
					b. Plumbing lines and components	Check for damage, corrosion, or leaks (traces of oil) (Fig. 1-8).	
					c. Recirculating and condenser fans	Check for damage, corrosion, and foreign material. Check fan rotation. Replace fans that rotate in the wrong direction. NOTE Fan rotation must be checked as the fans are coasting to a stop.	

Table 4-1. Organizational Preventive Maintenance Checks and Services (Cont'd)

W--Weekly (40 Hours)
M--Monthly (100 Hours)
S--Semiannual (500 hours)
H--Hours (As Indicated)

Item No.	Interval W	M	S	H	Item to be Inspected	Procedures	Equipment Will Be Reported Not Ready (RED) If:
					d. Evaporators, condensers, and compressors	Check for damage, corrosion, accumulation of foreign material and leaks (traces of oil) (Fig. 1-8).	
3		•			Water system		
					Plumbing lines and components	Check for damage, corrosion, or leaks through access door of air temperature control panel (Fig. 1-11).	
4			•		Complete power plant, utility	Open all access doors and remove all access panels (Fig. 1-1, 1-2 and 4-32).	
					a. Paint, fasteners, hinges, panels, structural parts, frame, and fittings.	Inspect for damage, corrosion, cracks, loose or missing parts (Fig. 1-1 and 1-2).	
					b. Electrical wiring and connectors	Inspect for burned, frayed, broken or loose wires and bent, cracked or broken connectors (Fig. 1-7).	
					c. Interior insulation	Inspect for burned, frayed or damaged insulation.	
					d. Fuel filter element	Replace fuel control filter element and engine fuel filter element (Fig. 4-44 and 4-45).	
					e. Igniter plug and combustion chamber liner	Inspect and clean igniter plug and combustion liner (Fig. 4-50 and 4-51).	
5				•	Lubrication	Lubricate in accordance with lubrication order LO 5-6115-590-12 each 500 hours of operation.	
6				•	External fuel filter/separator	Replace fuel filter element after each 250 hours of operation (Fig. 3-1).	
7				•	Air regulator filter element	Inspect and clean filter element after each 2500 hours of operation (Fig. 4-28).	

Table 4-2. Troubleshooting

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION	
ENGINE	
1. FUEL BOOST PUMP/MOTOR ASSEMBLY FAILS TO RUN.	
Step 1. Check starting procedure.	**Review preparation for starting procedures in paragraph 2-10a.**
Step 2. Check specific gravity of electrolyte in batteries.	**Recharge or replace batteries as indicated or use an external power source.**
Step 3. Check cables and batteries for corrosion or loose connection.	**Clean battery cables or connect battery cables. (fig. 4-1)**
Step 4. Check for low or depleted fuel supply.	**Replenish fuel supply.**
Step 5. Check for incorrect or loose electrical connections to fuel boost pump motor.	**Tighten or replace connections (fig. 4-34)**
Step 6. Check continuity between switch poles of master switch (S1) with power supply off and switch on.	**If no continuity, replace master switch. (fig. 4-21)**
Step 7. Check to see if circuit breaker (CB1) has tripped.	**Reset circuit breaker. Replace failed circuit breaker. (fig. 4-21)**
Step 8. Check fuel boost pump switch (S8).	**Replace switch. (fig. 4-21)**
Step 9. Check air intake door switch (S4).	**Replace switch.**
Step 10. Check shunt (R1).	**Replace shunt. (fig. 4-37)**
Step 11. Check boost pump motor.	**Replace boost pump motor. (fig. 4-34)**
2. NO RESPONSE WHEN MASTER SWITCH (S1) IS PLACED IN START POSITION.	
Step 1. Check starting procedure.	**Start procedure is correct. (Para. 2-10) Proceed to Step 2.**
Step 2. Check specific gravity of electrolyte.	**Recharge or replace batteries.**
Step 3. Check cables for corrosion or loose connection.	**Clean or connect battery cables. (fig. 4-1)**
Step 4. Check circuit breaker (CB1).	**Reset or replace circuit breaker. (fig. 4-21)**
Step 5. Check master switch (S1).	**Replace switch. (fig. 4-21)**
Step 6. Check intake door switch (S4).	**Replace failed switch.**
Step 7. Check electrical connections to start motor.	**Tighten or replace electrical connections as indicated. (fig. 4-43)**
Step 8. Check cables.	**Replace starter cables. (fig. 4-43)**
Step 9. Check relay (K1).	**Replace relay. (fig. 4-39)**
Step 10. Check 400 Hz main contactor switch (S2).	**Place switch in open position or replace switch. (fig. 4-21)**
Step 11. Check 60 Hz output contactor switch (S3).	**Place switch in open position or replace switch. (fig. 4-21)**
Step 12. Check centrifugal multispeed switch assembly overspeed 110 percent switch or 35 percent switch.	**Replace multispeed switch. (fig. 4-43)**
Step 13. Check start motor assembly.	**Replace starter. (fig. 4-43)**
Step 14. Check time delay relay (K4).	**Replace relay. (fig. 4-37).**
3. START MOTOR RUNS BUT DOES NOT ROTATE ENGINE.	
Check start motor assembly.	**Replace starter (fig. 4-43)**
4. ENGINE STOPS MOTORING WHEN MASTER SWITCH IS RELEASED FROM START POSITION.	
Step 1. Check switch (S1).	**Replace master switch. (fig. 4-21)**
Step 2. Check start relay (K1).	**Replace relay. (fig. 4-39)**
Step 3. Check holding relay (K3).	**Replace relay. (fig. 4-37)**
5. START MOTOR FAILS TO SHUT OFF WHEN ENGINE REACHES 35 PERCENT OF GOVERNED SPEED.	
Step 1. Check start relay (K1).	**Replace relay. (fig. 4-39)**
Step 2. Check centrifugal multispeed switch assembly 35 percent switch.	**Replace centrifugal multispeed assembly. (fig. 4-43)**
6. ENGINE MOTORS BUT COMBUSTION DOES NOT OCCUR.	
Step 1. Check specific gravity of electrolyte.	**Recharge or replace batteries as indicated.**
Step 2. Check for low or depleted fuel supply.	**Replenish fuel supply.**
Step 3. Check for clogged fuel lines of filters.	**Replace fuel filters as indicated. (fig. 4-45)**
Step 4. Check fuel control assembly.	**Replace fuel control assembly. (fig. 4-44)**
Step 5. Check fuel boost pump and motor assembly.	**Replace fuel boost pump and motor. (fig. 4-34)**
Step 6. Check fuel atomizer.	**Clean screen or replace fuel atomizer assembly. (fig. 4-50)**
Step 7. Check for actuation of fuel solenoid valve.	**Replace solenoid valve. (fig. 4-45)**
Step 8. Check oil supply.	**Replenish oil supply.**
Step 9. Check oil pump pressure relief valve.	**Replace pressure relief valve. (fig. 4-47)**
Step 10. Check oil pressure sequencing switch.	**Refer to paragraph 4-70d for adjustment procedure. Replace failed sequencing switch. (fig. 4-41)**

Table 4-2. Troubleshooting—Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION	
Step 11.	Check for turbine exhaust obstruction. **Remove obstruction.**
Step 12.	Check ignition unit. **Refer to paragraph 4-69c for ignition unit test.** **Replace ignition unit. (fig. 4-41)**
Step 13.	Check igniter plug or ignition lead. **Refer to paragraph 4-67c for igniter plug test.** **Replace igniter plug or ignition lead. (fig. 4-41)**
7. ENGINE STARTS, ACCELERATES TO GOVERNED SPEED OR LESS AND SHUTS DOWN.	
Step 1.	Check fuel pump governor setting. **Adjust governor setting, see paragraph 4-14e(4), or replace fuel control unit. (fig. 4-43)**
Step 2.	Check centrifugal multispeed switch assembly overspeed (110 percent) switch setting. **Refer to paragraph 4-14e(6) for adjustment procedure.** **Replace centrifugal multispeed switch assembly. (fig. 4-43)**
Step 3.	Check for shorted generator creating drag on engine and causing shutdown at approximately 35 percent governed speed. **Replace generator. (Para. 4-60)**
8. COMBUSTION OCCURS BUT ENGINE WILL NOT ACCELERATE OR ACCELERATES TOO SLOWLY.	
Step 1.	Check specific gravity of electrolyte. **Recharge or replace batteries as indicated or use external power source.**
Step 2.	Check fuel supply. **Replenish fuel supply.**
Step 3.	Check control air lines and fittings. **If air lines and fittings are secure replace fuel control unit.**
Step 4.	Check acceleration limiter valve adjustment. **Refer to paragraph 4-14e (3) for adjustment procedure.** **If proper adjustment cannot be obtained, replace fuel control unit. (fig. 4-44)**
Step 5.	Check control unit. **Replace fuel control unit. (fig. 4-44)**
Step 6.	Check acceleration and overtemperature control thermostat adjustment. **Refer to paragraph 4-14e (1) for adjustment procedure.** **Replace failed thermostat. (fig. 4-49)**
Step 7.	Check fuel atomizer. **Replace fuel atomizer assembly. (fig. 4-50)**
Step 8.	Check for leakage from ducts and plenum. Check load control valve for closed position. **Replace load control valve if full closed. (fig. 4-28)**
9. EXCESSIVE EXHAUST GAS TEMPERATURE ON START.	
Step 1.	Check acceleration and overtemperature control thermostat adjustment. **Refer to paragraph 4-14e (1) for adjustment procedure.** **Replace thermostat. (fig. 4-49)**
Step 2.	Check acceleration limiter valve adjustment. **Refer to paragraph 4-14e (3) for adjustment procedure.** **If proper adjustment cannot be obtained, replace fuel control assembly. (fig. 4-44)**
Step 3.	Check fuel atomizer flow divider valve. **Replace fuel atomizer assembly.**
10. ERRATIC ENGINE ACCELERATION, OPERATION, OR INABILITY TO CARRY LOAD.	
Step 1.	Check for contamination in fuel spray. **Replace fuel filters. (fig. 4-50)**
Step 2.	Check atomizer assembly. **Clean fuel atomizer screen or replace fuel atomizer assembly. (fig. 4-50)**
Step 3.	Check fuel filter. **Replace fuel filter. (fig. 4-45)**
Step 4.	Check control air lines and fittings for leaks. **If air lines and fittings are secure, replace fuel control assembly. (fig. 4-44)**
Step 5.	Check acceleration and overtemperature thermostat adjustment. **Refer to paragraph 4-14e (1) for adjustment procedure.** **Replace thermostat. (fig. 4-49)**
Step 6.	Check fuel control assembly. **Replace fuel control assembly. (fig. 4-44)**
Step 7.	Check flame tube and combustion cap assembly. **Clean flame tube and combustion cap. Replace as required. (fig. 4-50)**
Step 8.	Check load control valve for full closed position. **If full closed position cannot be obtained, replace load control valve. (fig. 4-28)**
Step 9.	Check fuel solenoid valve. **Check actuation of valve. Replace valve. (fig. 4-45)**
Step 10.	Check fuel boost pump and motor assembly. **Replace fuel boost pump and motor assembly. (fig. 4-34)**
Step 11.	Check for restricted fuel supply. **Locate and remove restriction.**
11. SMOKE EMITTED FOR SHORT TIME AFTER START.	
Step 1.	Check for excessive oil in system or oil tank. **Drain oil to proper level.**
Step 2.	Check scavenge oil pump. **Replace oil pump. (fig. 4-48)**
Step 3.	Check fuel plenum drain check valve. **Clean or replace drain valve. (fig. 4-49)**
12. EXCESSIVE OIL TEMPERATURE.	
Step 1.	Check oil supply. **Check oil tank dipstick for proper oil level.**
Step 2.	Check for restriction in oil cooler cooling air tubes. **Remove restriction.**
Step 3.	Check oil cooling fan. **Replace cooling fan. (fig. 4-43)**
Step 4.	Check oil temperature regulator valve. **Replace regulator valve. (fig. 4-40)**

Table 4-2. Troubleshooting—Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
LOSS OF OIL PRESSURE.
ep 1. Check oil supply. **Check oil tank dipstick for proper oil level. Replenish oil as required.**
ep 2. Check oil pump pressure relief valve. **Replace pressure relief valve. (fig. 4-47)**
ep 3. Check oil lines for kinks or damage. **Replace damaged oil line.**
ep 4. Check oil filter element. **Replace oil filter element. (fig. 4-47)**
LOAD CONTROL VALVE FAILS TO OPEN.
ep 1. Refer to fig. 2-14 for operation to deliver 400 Hz power. **Replace failed components as required.**
ep 2. Check solenoid valve. **Replace solenoid valve. (fig. 4-28)**
ep 3. Check air pressure regulator valve. Refer to paragraph 4-14e (5) for adjustment procedure. **Replace Filter element.** **Replace air pressure regulator assembly. (fig. 4-28)**
ep 4. Check load control thermostat adjustment. **Refer to paragraph 4-14e (2) for adjustment procedure.** **Replace failed thermostat. (fig. 4-28)**
ep 5. Check control air line and fittings for leaks. **Tighten as required, or replace damaged line.**
ep 6. Check load control valve. **Replace load control valve. (fig. 4-28)**
NO 60 HZ AC GENERATOR OUTPUT (60 Hz trip indicator lamp D55 illuminated)
p 1. Check for overload on output. **Adjust load, reset load contactor switch S3 and check each phase with 60 Hz volt-amp switch S25.**
p 2. Check 60 Hz load contactor switch S3. **Replace switch. (fig. 4-21)**
p 3. Check under frequency arming relay K6. **Refer to paragraph 4-58f (3) to check for K6 relay failure. Replace relay. (fig. 4-37)**
p 4. Check 60 Hz generator control relay K8. **Replace relay. (fig. 4-37)**
p 5. Check 60 Hz output contactor relay K11. **Replace relay. (fig. 4-39)**
p 6. Check voltage regulator VR2. **Refer to paragraph 4-58d (3) to check for failed regulator.**
p 7. Check 60 Hz protective panel. **Refer to paragraph 58g (3) to check for failed protective panel. Replace protective panel.**
p 8. Check 60 Hz AC generator. **Refer to paragraph 4-61 to check for generator failure. Replace generator. (Para. 4-60)**

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
16. NO 400 HZ GENERATOR OUTPUT.
Step 1. Check for overload on output. **Adjust load. Reset contactor (K12) (Contactor is thermal, wait 10 seconds to reset). Check each phase with volt-amp switch.**
Step 2. Check 400 Hz output contactor (K12) **Replace contactor. (fig. 4-38)**
Step 3. Check 400 Hz output contactor switch (S9). **Replace contactor switch (S9). (fig. 4-21)**
Step 4. Check 500 Hz main contactor (K10). **Replace contactor (K10). (fig. 4-37)**
Step 5. Check 400 Hz main contactor switch (S2) **Replace contactor switch (S2). (fig. 4-21)**
Step 6. Check underfrequency arming relay (K6). **Replace relay (K6). (fig. 4-37)**
Step 7. Check 400 Hz generator control relay (K7). **Replace relay assembly. (fig. 4-37)**
Step 8. Check 400 Hz auxiliary main contactor relay (K9). **Replace relay (K9). (fig. 4-37)**
Step 9. Check voltage regulator (VR1). **Replace voltage regulator (VR1). (fig. 4-37)**
Step 10. Check 400 Hz protective panel. **Refer to paragraph 4-58d (3) to check for protective panel failure.**
17. NO WATER AT WATER SYSTEM OUTLETS.
Step 1. Check water supply. **Replenish water supply.**
Step 2. Check water system is properly primed. **Refer to paragraph 4-2b (5) for priming instructions.**
Step 3. Check for 400 Hz power. **Replace components as required.**
Step 4. Check 400 Hz auxiliary main contactor (K9). **Replace main contactor (K9). (fig. 4-37)**
Step 5. Check hot water pump contactor (K15). **Replace contactor (K15). (fig. 4-38.7)**
Step 6. Check circuit breakers (CB6), (CB12) or (CB11). **Reset circuit breakers or replace circuit breakers as required. (fig. 4-21)**
18. NO HOT WATER.
Step 1. Check exhaust gas flow control valve (K14). **Replace control valve (K14). (fig. 4-29)**
Step 2. Check hot water temperature switch (S12). **Replace temperature switch (S12). (fig. 4-26)**
Step 3. Check pressure switch (S11). **Replace Switch (S11). (fig. 4-26)**
Step 4. Check 400 Hz auxiliary main contactor relay (K9). **Replace relay (K9). (fig. 4-37)**
Step 5. Check pressure regulator. **Replace regulator. (fig. 4-26)**
Step 6. Check hot water pump (B15) **Replace hot water pump. (fig. 4-26)**

Table 4-2. Troubleshooting—Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
19. HOT WATER EXCESSIVELY HOT TURNED TO STEAM.
Step 1. Check exhaust gas flow control valve. **Replace flow control valve. (fig. 4-29)**
Step 2. Check hot water temperature switch (S12). **Replace temperature switch. (fig. 4-26)**
20. VENTILATING AIR SYSTEM WILL NOT START.
Step 1. Check for 400 Hz power. **Refer to figure 2-14 for operation to deliver 400 Hz power. Replace failed components as required.**
Step 2. Check recirculating fan circuit breakers (CB15 and CB16). **Reset circuit breakers. Replace circuit breakers as required. (fig. 4-22)**
Step 3. Check vent system select switch (S14) **Replace switch (S14). (fig. 4-21)**
Step 4. Check mode select switch (S16). **Replace switch (S16). (fig. 4-21)**
Step 5. Check recirculating fan contactors (K25) or (K26). **Replace contactors as required.**
Step 6. Check diode (CR12). **Replace diode (CR12).**
21. HEATED AIR SYSTEM WILL NOT DELIVER HEATED AIR.
Step 1. Check for 400 Hz power. **Refer to figure 2-14 for operation to deliver 400 Hz power.**
Step 2. Check recirculating fan circuit breaker (CB15) or (CB16). **Reset circuit breakers. Replace circuit breakers as required. (fig. 4-22)**
Step 3. Check heat system select switch (S31). **Replace switch (S31). (fig. 4-21)**
Step 4. Check mode selector switch (S16). **Replace switch (S16). (fig. 4-21)**
Step 5. Check load control valve. **Replace load control valve. (fig. 4-28)**
Step 6. Check air pressure regulator. **Replace air pressure regulator. (fig. 4-28)**
Step 7. Check load control thermostat adjustment. **Refer to paragraph 4-14e (1) for proper adjustment procedure. Replace thermostat. (fig. 4-28)**
Step 8. Check heat temperature sensors (RT1, RT2, RT5, RT6). **Replace temperature sensor as required. (fig. 1-7)**
Step 9. Check heat system flow control valve. **Replace flow control valve. (fig. 4-29)**
Step 10. Check overtemperature thermoswitch (TS5) or (TS9). **Replace thermoswitch as required. (fig. 1-7)**
Step 11. Check diode (CR15) or (CR16). **Replace diode as required.**
Step 12. Check to see if jumper plug (J93) is installed. **Install or replace jumper plug as required.**
22. COOLED AIR SYSTEM WILL NOT DELIVER COOLED AIR. **(Refer also to malfunctions listed under item 20)**
Step 1. Check sight glass. **If refrigerant is low, refer problem to direct and general support maintenance.**
Step 2. Check solenoid valves, pressure controls and lines. **Refer problem to direct and general support maintenance.**
Step 3. Check compressor time delay and reset relay (K17) or (K18). **Replace relay as required. (fig. 4-22)**

Table 4-3 TEMPERATURE CONVERSION CHART

To convert a temperature from °C to °F—locate Centigrade temperature in the center column and read the corresponding Fahrenheit value in the column to the left. To convert a temperature from °F to °C—locate Fahrenheit temperature in the center column and read the corresponding Centigrade value in the column to the right.

°F	°C °F	°C	°F	°C °F	°C	°F	°C °F	°C	°F	°C °F	°C
	-459.7	-273.2		-320	-195.6	-310	-190	-123.3	-58.0	-50	-45.6
	-450	-267.8		-310	-190.0	-292.0	-180	-117.8	-40.0	-40	-40.0
	-440	-262.2		-300	-184.3	-274.0	-170	-112.2	-36.4	-38	-38.9
	-430	-256.7		-290	-178.9	-256.0	-160	-106.7	-32.8	-36	-37.8
	-420	-251.1		-280	-173.3	-238.0	-150	-101.1	-29.2	-34	-36.7
	-410	-245.6	-459.7	-273.2	-169.6	-220	-140	-95.6	-25.6	-32	-35.6
	-400	-240.0	454.0	-270	-167.8	-202.0	-130	-90.0	-22.0	-30	-34.4
	-390	-234.4	-436.0	-260	-162.2	-184.0	120	-4.4	-18.4	-28	-33.3
	-380	-228.9	-418.0	-250	-156.7	-166.0	-110	-78.9	-14.8	-26	-32.2
	-370	-223.3	-400	-240	-151.1	-148.0	-100	-73.3	-11.2	-24	-31.1
	-360	-217.8	-382.0	-230	-145.6	-130.0	-90	-67.8	-7.6	-22	-30.0
	-350	-212.2	-364.0	-220	-140.0	-112.0	-80	-62.2	-4.0	-20	-28.9
	-340	-206.7	-346.0	-210	-134.4	-94.0	-70	-56.7	-0.4	-18	-27.8
	-330	-201.1	-328.0	-200	-128.9	-76.0	-60	-51.1	+3.2	-16	-26.7
6.8	-14	-25.6	71.6	22	-5.6	136.4	58	14.4	201.2	94	34.4
10.4	-12	-24.4	75.2	24	-4.4	140.0	60	15.6	204.8	96	35.6
14.0	-10	-23.3	78.8	26	-3.3	143.6	62	16.7	208.4	98	36.7
17.57	-8	-22.2	82.4	28	-2.2	147.2	64	17.8	212.0	100	37.8
21.2	-6	-21.1	86.0	30	-1.1	150.8	66	18.9	215.0	102	38.9
24.8	--	-20.0	89.6	32	0	154.4	68	20.0	219.0	104	40.0
28.4	-2	-18.9	93.2	34	+1.1	158.0	70	21.1	222.8	106	41.1
32.0	0	-17.8	96.8	36	2.2	161.6	72	22.2	226.4	108	42.2
35.6	+2	-16.7	100.4	38	3.3	165.2	74	23.3	230.0	110	43.3
39.2	4	-15.6	104.0	40	4.4	168.8	76	24.4	233.0	112	44.4
42.8	6	-14.4	107.6	42	5.6	172.4	78	25.6	237.2	114	45.6
46.4	8	-13.3	111.2	44	6.7	176.0	80	26.7	240.8	116	46.7
50.0	10	-12.2	114.8	46	7.8	179.6	82	27.8	244.4	118	47.8
53.6	12	-11.1	118.4	48	8.9	183.2	84	28.9	248.0	120	48.9
57.2	14	-10.0	122.0	50	10.0	186.8	86	30.0	251.6	122	50.0
60.8	16	-8.9	125.6	52	11.1	190.4	88	31.1	255.2	124	51.1
64.4	18	-7.8	129.2	54	12.2	194.0	90	32.2	258.8	126	52.2
68.0	20	-6.7	132.8	56	13.3	197.6	92	33.3	262.4	128	53.3
266.0	130	54.4	327.2	164	73.3	392.0	200	93.3	453.2	234	112.2
269.0	132	55.6	330.8	166	74.4	395.6	202	94.4	465.8	236	113.3
273.2	134	56.7	334.4	168	75.6	399.2	204	95.6	460.4	238	114.4
276.8	136	57.8	338.0	170	76.7	402.8	206	96.7	464.0	240	115.6
280.4	138	58.9	345.2	174	78.9	406.4	208	97.8	467.6	242	116.7
284.0	140	60.0	348.8	176	80.0	410.0	210	98.9	471.2	244	117.8
287.6	142	61.1	352.4	178	81.1	413.6	212	100.0	474.8	246	118.9
291.2	144	62.2	356.0	180	82.2	417.2	214	101.1	478.4	248	120.0
294.8	146	63.3	359.6	182	83.3	420.8	216	102.2	482.0	250	121.1
298.4	148	64.4	363.2	184	84.4	424.4	218	103.3	500.0	260	126.7
302.0	150	65.5	366.8	186	85.6	428.0	220	104.4	518.0	270	132.2
305.6	152	66.7	370.4	188	86.7	431.6	222	105.6	536.0	280	137.8
309.2	154	67.8	374.0	190	87.5	435.2	224	106.7	554.0	290	143.3
312.8	156	68.9	377.6	192	88.9	438.8	226	107.8	572.0	300	148.9
316.4	158	70.0	381.2	194	90.0	442.4	228	108.9	590.0	310	154.4
320.0	160	71.1	384.8	196	91.1	446.0	230	110.0	608.0	320	160.0
323.6	162	72.2	388.4	198	92.2	449.6	232	111.1	626.0	330	165.6
644.0	340	171.1	968.0	520	271.1	1292.0	700	371.2	1616	880	471.1
662.0	350	176.7	968.0	530	276.7	1320.0	710	376.7	1634.0	890	476.7
680.0	360	182.2	1004.0	540	282.2	1328.0	720	382.2	1652.0	900	482.2
698.0	370	187.8	1022.0	550	287.8	1346.0	730	387.8	1670.0	910	487.8
716.0	380	193.3	1040.0	560	293.3	1364.0	740	393.3	1688.0	920	493.3
734.0	390	198.9	1058.0	570	298.9	1382.0	750	398.9	1706.0	930	498.9
752.0	400	204.4	1076.0	580	304.4	1400.0	760	404.4	1724.0	940	504.4
770.0	410	210.0	1094.0	590	310.0	1418.0	770	410.0	1742.0	950	510.0
788.0	420	215.6	1112.0	600	315.6	1436.0	780	415.6	1760.0	960	521.1
806.0	430	221.1	1130.0	610	321.1	1454.0	790	421.1	1778.0	970	521.1
824.0	440	226.7	1148.0	620	326.7	1472.0	800	426.8	1796.0	980	526.7
842.0	450	232.2	1166.0	630	332.2	1490.0	810	432.2	1814.0	990	532.2
860.0	460	237.8	1184.0	640	337.8	1508.0	820	437.8	1832.0	1000	537.8
878.0	470	243.3	1202.0	650	343.3	1526.0	830	443.3	1922.0	1050	565.5
896.0	480	248.9	1220.0	660	348.9	1544.0	840	448.9	2012.0	1100	593.2
914.0	490	254.4	1238.0	670	354.4	1562.0	850	454.4	2102.0	1150	621.1
932.0	500	260.0	1256.0	680	360.0	1580.0	860	460.0	2192.0	1200	648.9
950.0	510	265.6	1274.0	690	365.5	1598.0	870	465.6	2282.0	1250	676.7
									2372.0	1300	704.4

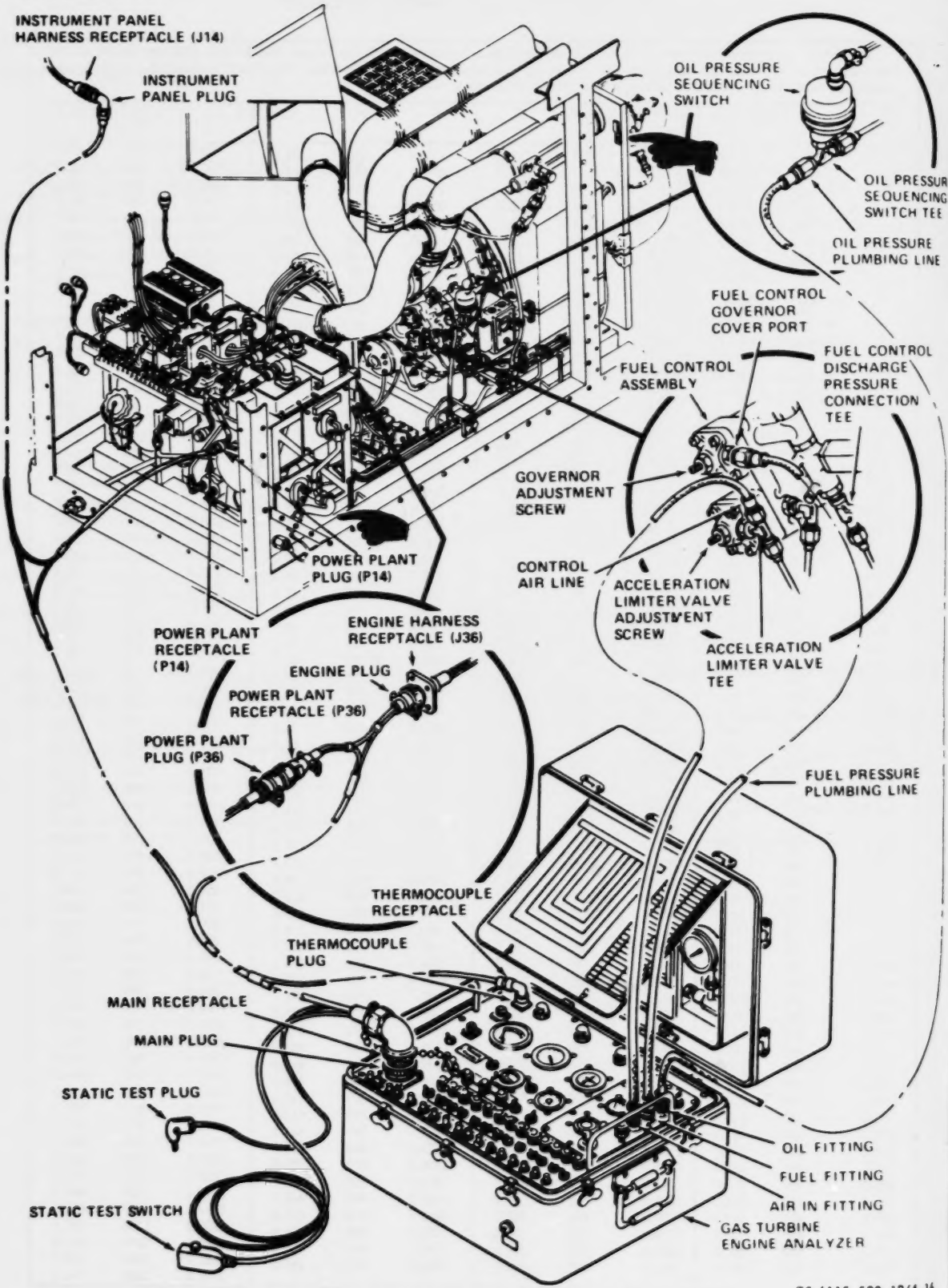


Figure 4-16. Connecting Analyzer to Power Plant. (TS 6115-590-12/4-16).

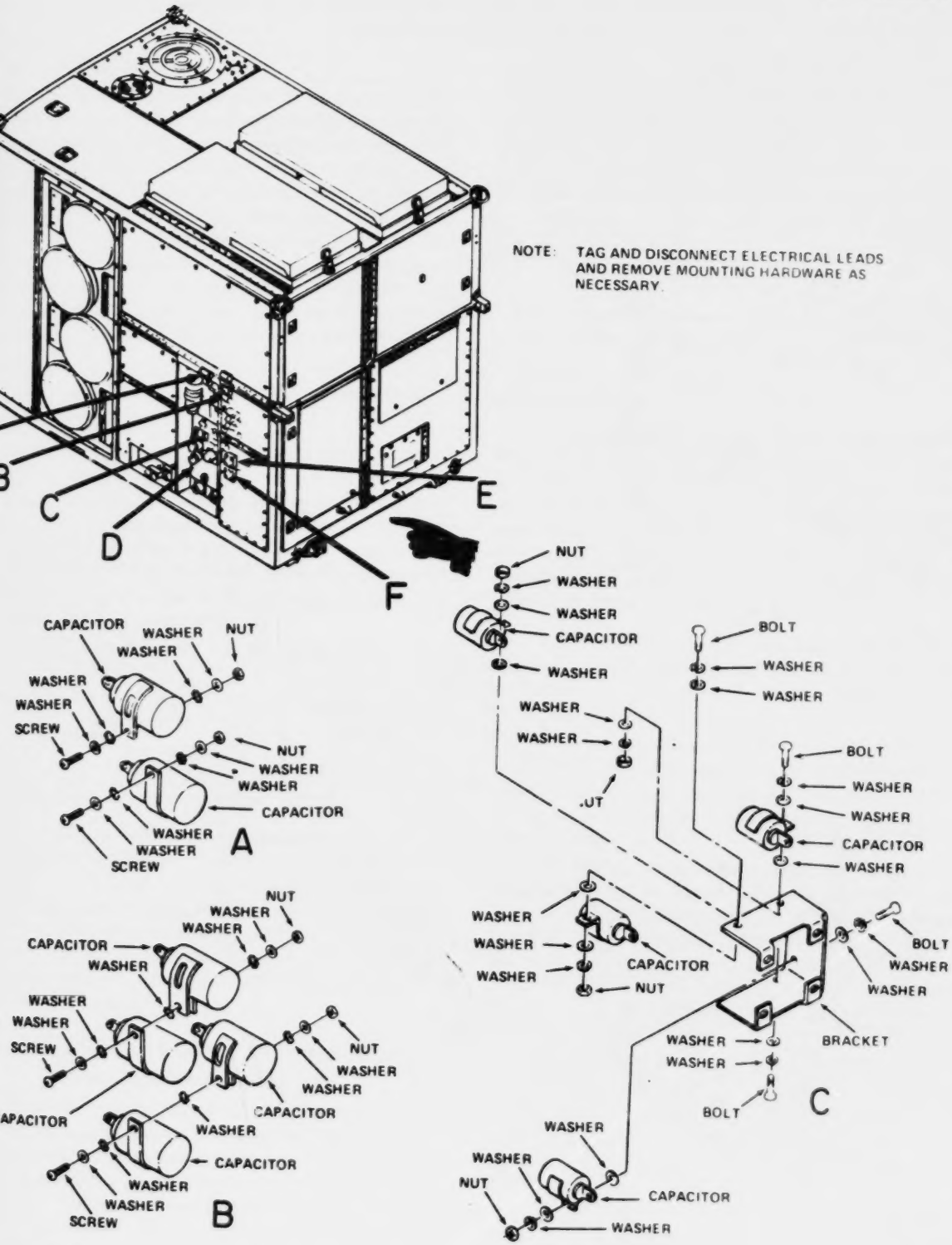


Figure 4-17. Radio Interference Suppression Components (Sheet 1 of 2). (TS 6115-590-12/4-17[1]).

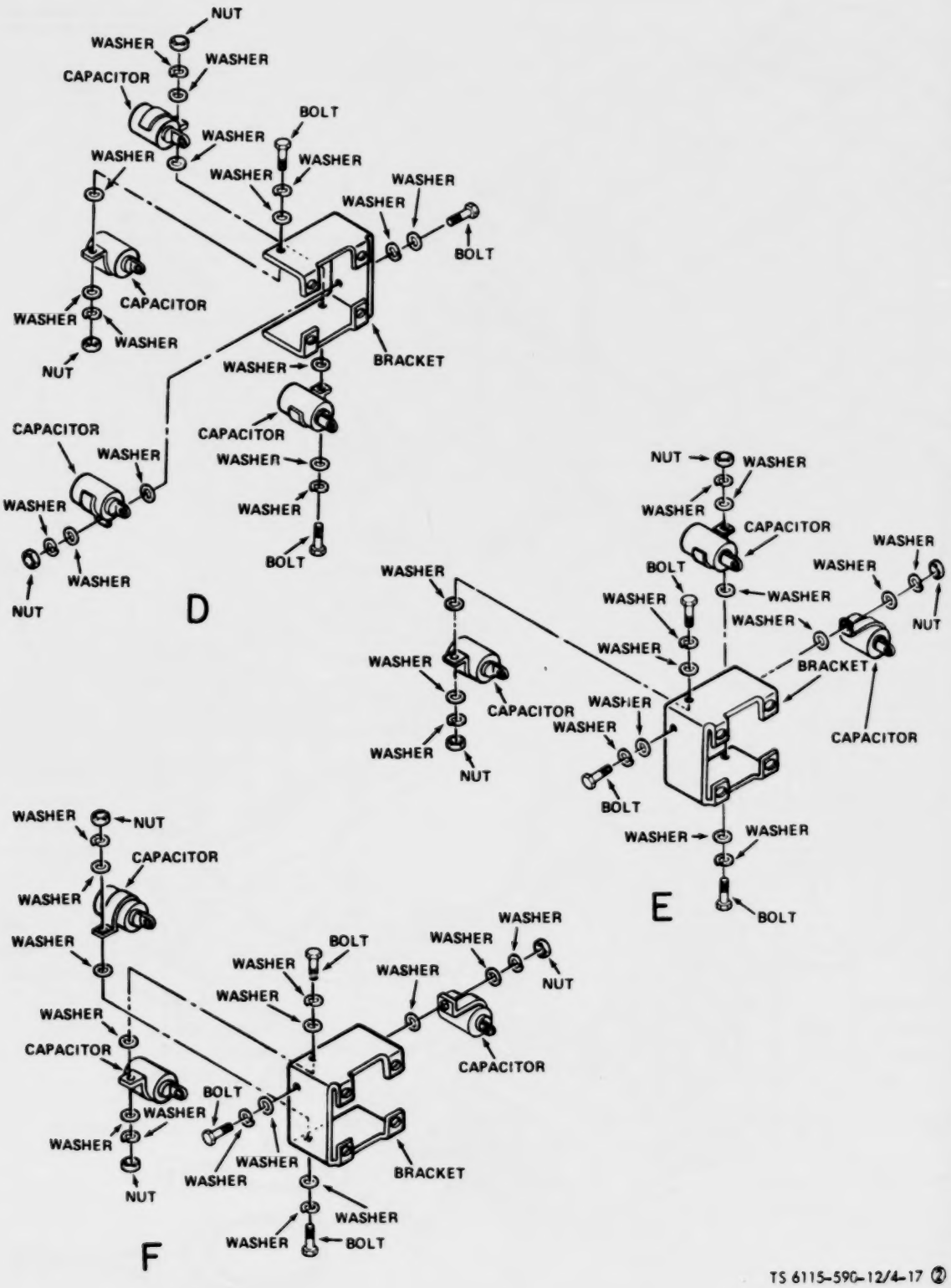


Figure 4-17. Radio Interference Suppression Components (Sheet 2 of 2). (TS 6115-690-12/4-17[2]).

Section V. Preventive Maintenance Checks and Services (Monthly and Quarterly)

11. General

To insure that the power plant is ready for operation at all times, it must be inspected systematically that defects may be discovered and corrected fore they result in serious damage or failure. The cessary preventive maintenance checks and rvices to be performed are listed and described in ragraph 4-12. The item numbers indicate the quence of minimum inspection requirements. efects discovered during operation of the unit will noted for future correction, to be made as soon as eration has ceased. Stop operation immediately if a deficiency is noted during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded, together with the corrective action taken, on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

4-12. Preventive Maintenance Checks and Services

Preventive maintenance checks and services are listed and described in table 4-1.

Section VI. Troubleshooting

13. General

a. This section contains troubleshooting information for locating and correcting most of the operating uble which may develop in the power plant. Each lfunction for an individual component, unit, or stem is followed by a list of tests or inspections ich will help you to determine probable causes and rrective actions to take. You should perform the ts/inspections in the order listed.

b. This manual cannot list all malfunctions that y occur, nor all tests or corrective actions. If a lfunction and its corrective action is not listed, tify your supervisor.

NOTE

ll replacement procedures for circuit breakers, switches nd relays are performed in a similar manner.

c. A gas turbine engine analyzer is used in njunction with table 4-2 for checking engine operation and isolating malfunctioning components ring troubleshooting, and for check and adjustment of engine components after repair. The connection and operation of the engine analyzer is described paragraph 4-14. A temperature conversion chart is vided in table 4-3.

4. Using Gas Turbine Engine Analyzer During Troubleshooting

Gas Turbine Engine Analyzer. The gas turbine ine analyzer provides instrumentation for checking the engine electrical, hydraulic, and control air tems, and for controlling and monitoring engine ration during troubleshooting or checking proces after repair. The analyzer includes a separate table fuel pressure gauge and gauge saver, a timeter, and special cable assemblies, all of ch are stored in the analyzer case. The analyzer trol panel is shown in figure 4-14. The analyzer cables, hoses, and a special purpose cable assembly required to connect the analyzer to the power plant are shown in figure 4-15. The three hoses required are not part of the analyzer and must be procured separately. An overlay plate, part of the special purpose cable assembly, which must be installed on the analyzer panel to provide connection nomenclature, is shown in figure 4-15.

b. Connection of Gas Turbine Engine Analyzer to Power Plant. Connect the analyzer to the power unit as shown in figure 4-16 while observing the following.

(1) Place analyzer in a convenient position near the left side of the power plant to facilitate connections. Insure that all analyzer switches are in OFF or spring-loaded position before making any connections to power plant.

(2) Install main receptacle of special purpose cable assembly on MAIN plug of analyzer panel. Install overlay plate (figure 4-15), attached to special purpose cable assembly, over analyzer indicator lights and switches locating cutout in plate over READY TO LOAD LIGHT on analyzer panel (figure 4-14) to provide correct identification of analyzer lights, switches, and static test jacks.

(3) Disconnect engine harness receptacle J36 from power plant plug P36 (figure 4-16). Connect engine plug on special purpose cable assembly to engine harness receptacle J36; connect power plant receptacle P36 on special purpose cable assembly to power plant plug P36.

(4) Disconnect instrument panel harness receptacle J14 from power plant plug P14. Connect instrument panel plug on special purpose cable assembly to instrument panel harness receptacle J14. Connect power plant receptacle P14 on special purpose cable assembly to power plant plug P14.

(5) Connect thermocouple receptacle on special purpose cable assembly to thermocouple plug on analyzer panel.

(6) Remove cap from acceleration limiter valve tee. Connect a control air hose from open leg of tee to AIR IN fitting on analyzer panel. Remove cap from AIR OUT fitting on analyzer panel and check that needle valve is closed (fig. 4-14).

(7) Remove cap from fuel control governor cover port. Connect a fuel pressure hose from the governor cover port to fuel fitting on analyzer panel (fig. 4-16).

(8) Remove cap from oil pressure sequencing switch tee. Connect oil pressure hose from oil pressure sequencing switch tee to oil fitting on analyzer panel.

c. Static Check of Components. Perform static check of engine components as follows:

(1) Place all analyzer switches in the OFF or springloaded position.

(2) Place MASTER switch on power plant instrument panel (fig. 2-1) in RUN position to provide DC power to engine circuits.

(3) Insert static test plug on special purpose cable assembly (fig. 4-16) in the appropriate test jack for the component to be checked (as identified by the overlay plate, (fig. 5-15), actuate static check switch on special purpose cable assembly (fig. 4-16). The component being checked may be heard or felt to actuate.

NOTE

The multimeter provided with the analyzer may be connected in series with the static test lead and actuation of the component being checked will be indicated on the multimeter ampere scale by current draw.

d. Functional Check Procedure. Perform functional check of power plant starting and operation as follows.

(1) Place all analyzer switches, except motor rotate switch, in the ON or spring loaded position.

(2) Place power plant controls in normal local operating position with master switch (fig. 2-11, sheet 1 of 2) in RUN position. Press in battery charging, turbine engine control, and generator control circuit breakers on power plant instrument panel. The DC power lamp on the analyzer panel (fig. 4-14) should illuminate, indicating DC power from the power plant is available at the analyzer. The press-to-test indicator lamps on the power plant instrument panel will illuminate when pressed. The low oil pressure lamp on the analyzer panel will illuminate.

(3) Momentarily place analyzer start switch, or power plant master switch (fig. 2-11, sheet 1 of 2) in the START position then release to RUN position. The start relay (K1) will actuate, indicated by an audible clicking noise, the fuel boost pump will run, and the starter motor will rotate the engine. Observe that the following occurs on the analyzer control panel (fig. 4-14).

(*a*) K3 TURBINE HOLD lamp illuminates.
(*b*) K4 TIME DELAY lamp illuminates.
(*c*) STARTER lamp illuminates.
(*d*) TACK GENERATOR RPM indicator indicates rpm.
(*e*) MOTOR ROTATE lamp illuminates.

(4) When rising oil pressure reaches 2.5 to 3.5 psig, the oil pressure sequencing switch will actuate, opening the fuel solenoid valve; the ignition unit will energize, indicated by an audible cracking noise, and combustion will occur. Observe that the following occurs on the analyzer control panel.

(*a*) FUEL lamp illuminates.
(*b*) IGNITION lamp illuminates.
(*c*) EXHAUST TEMP indicator indicates exhaust gas temperature.

NOTE

Engine acceleration rate may be controlled by adjusting the NEEDLE VALVE to bleed off fuel control assembly control air to slow the rate of acceleration during observation of the various actuation points.

(5) When the engine accelerates to approximately 35 percent governed speed, the centrifugal multi-speed switch starter cutout actuates to de-energize the start relay (K1), time delay relay (K4) and the start motor. Observe that the following occurs on the analyzer control panel.

(*a*) STARTER lamp extinguished.
(*b*) K4 TIME DELAY lamp extinguished.
(*c*) MOTOR ROTATE lamp extinguished.
(*d*) Compressor air pressure is evident at analyzer AIR gauge.
(*e*) K3 TURBINE HOLD lamp remains illuminated.
(*f*) DC VOLTAGE increases.

(6) When the engine accelerates to approximately 75 percent governed speed, the OIL gauge on the analyzer control panel will indicate 90 $\pm$ 10 psig.

(7) When the engine accelerates to approximately 95 percent governed speed, the centrifugal multi-speed switch ready to load and ignition cutout switch actuates to de-energize the ignition unit, and energize the time totalizing meter (M1), the ready to load lamp, the underfrequency arming relay (K6), and the 400 Hz generator control relay (K8). Check the engine time totalizing meter for satisfactory operation. Observe that the following occurs on the analyzer control panel.

(*a*) IGNITION lamp extinguished.
(*b*) READY TO LOAD lamp illuminated.

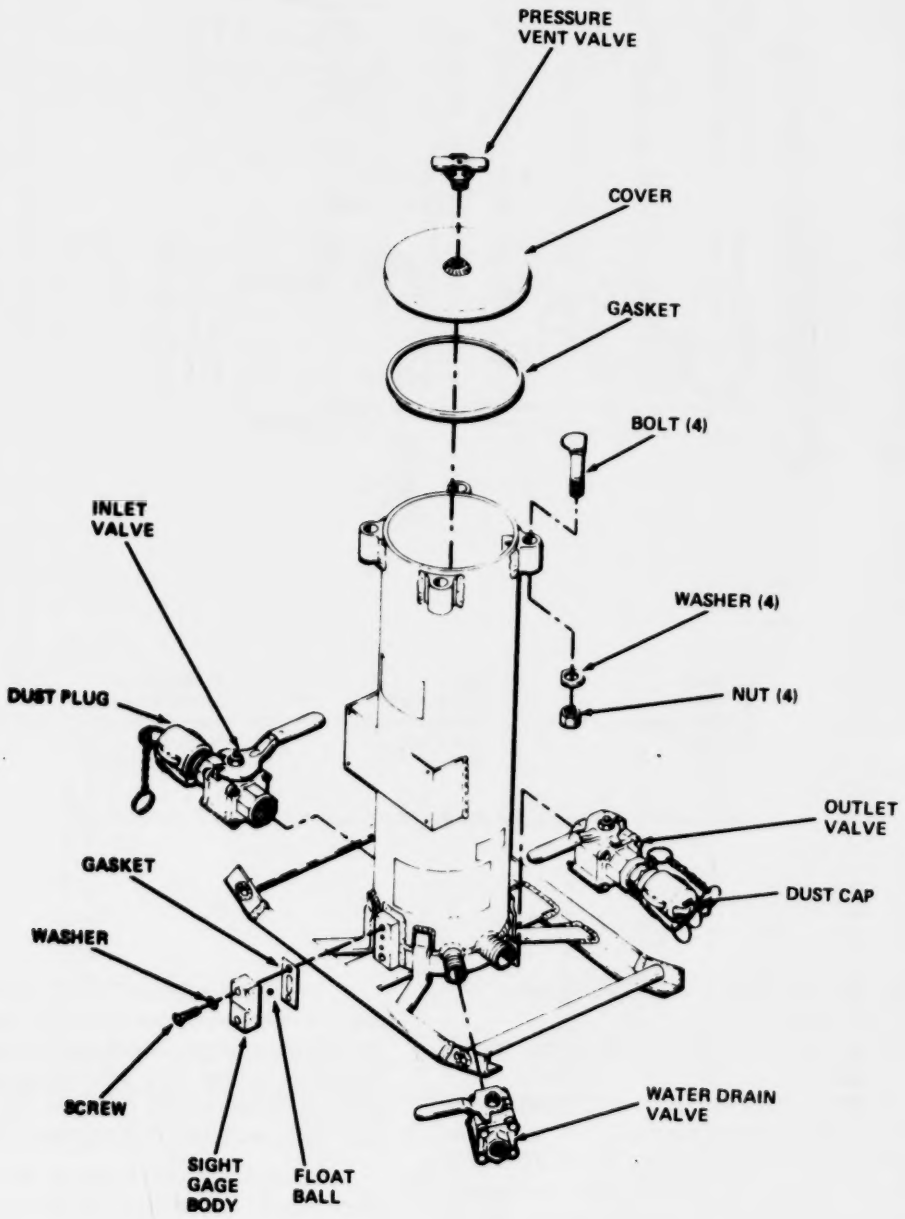
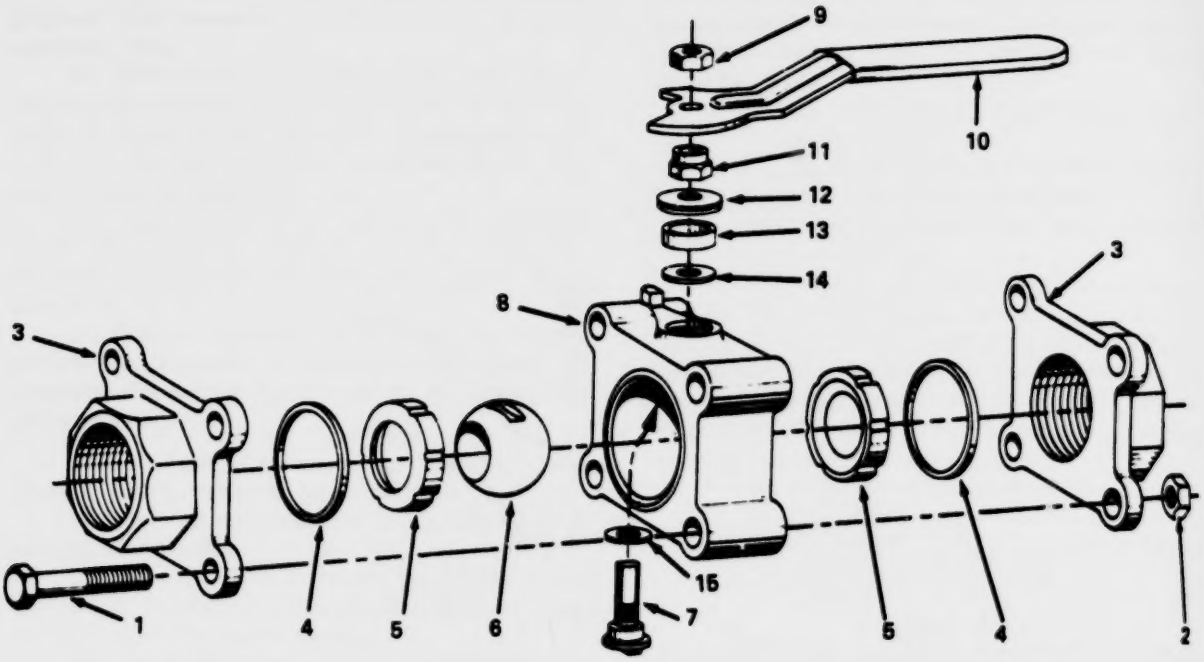


Figure 4-18. Tank and Skid Assembly, Filter/Separator. (TS 6115-590-12/4-18).



TS 6115-590-12/4-19

1. Bolt	6. Ball	11. Retainer nut
2. Nut	7. Valve stem	12. Bellville washer
3. Pipe end	8. Body	13. Seal follower
4. Seal	9. Stem nut	14. Stem seal
5. Seat	10. Handle	15. Thrust bearing

Figure 4-19. Inlet and outlet valves, filter/separator (TS 6115-590-12/4-19).

(*c*) K6 UNDERFREQUENCY lamp illuminated.

(*d*) K7 400 Hz CONTROL lamp illuminated.

(*e*) K8 60 Hz CONTROL lamp illuminated.

(8) With the engine operating at governed speed, momentarily actuate the EMERGENCY OPERATION switch on power unit instrument panel to ON position. This is a check on the 400 Hz output contactor (K12). Observe that the following occurs on the analyzer panel.

(*a*) K12 400 Hz OUTPUT CONTACTOR lamp illuminates.

(*b*) K7 400 Hz CONTROL lamp is extinguished.

(*c*) K8 60 Hz CONTROL lamp is extinguished.

(9) The 400 Hz OUTPUT CONTACTOR (K12) may be checked by an alternate method. Place 400 Hz system main contactor switch and output contact switch on power unit instrument panel in CLOSE position. Observe the K12 400 Hz OUTPUT CONTACTOR lamp on the analyzer panel illuminates.

(10) Actuate STOP switch on analyzer panel or place MASTER switch on power unit instrument panel in STOP position and observe that the engine shuts down.

NOTE

Sequence of events during performance check, table 4-4, may be utilized during the functional check procedure to determine the sequence of events, and as an aid in isolating failures.

NOTE: Turn on the following switches on analyzer. DC power, K-4 time delay, K-3 turbine hold, starter, ignition, fuel, K-5 under-frequency and load valve. Perform the following steps and observe analyzer and power unit indications.

Step	Condition	Power Unit Indication	Analyzer Indication	Remarks
1	Battery connected.		Panel lamps illuminate.	If not, circuit breaker (CB1) failed, or battery dead.
2	Air intake doors open.		DC power lamp illumination.	If not, air intake door switch (S4) failed.
3	Power unit instrument panel master switch (S1) in RUN position.	Instrument panel indicator lamps will push to test. If not, master switch (S1) failed.		
4	Power unit instrument panel master switch (S1) in START position.		K3 turbine hold lamp illuminated.	If not, 400 Hz main contactor switch not in open position or failed, or 60 Hz load contactor failed, master switch (S1) failed, under frequency arming relay (K6) normally closed contacts open, or centrifugal multispeed switch assembly 110 percent switch open.
			K4 time delay lamp illuminated.	If not, open centrifugal multi-speed switch assembly 35 percent switch open.
			Starter lamp illuminated.	If not, time delay (K4) contacts open.
		Start relay (K1) actuates. (Listen for audible clicking sound of relay.)		If not, press analyzer panel start switch—if start relay (K1) actuates, master switch (S1) failed.
				If start relay (K1) still does not actuate, start relay (K1) failed.
		Starter rotates engine.		If not, start relay (K1) contacts failed, or starter motor (B1) failed.
		Turbine hold relay (K8) actuates, fuel boost pump runs.		If not, turbine hold relay (K8) failed, or fuel boost pump failed.
5	Release power unit control panel master switch to RUN position.	Starter continues to rotate engine.		If not, start relay (K1) holding contacts failed or time relay (K4) actuates too soon (60 sec. time delay).
			K3 and/or K4 lamps extinguished.	Time delay relay (K4) contacts failed, or turbine hold relay (K3) failed.
		Fuel boost pump continues to run.		If not, turbine hold relay (K3) contacts failed.
6	Unit reaches approximately 10 percent governed speed, oil pressure sequencing switch actuates.	Fuel solenoid valves open.	Fuel lamp illuminates.	If not, no oil pressure, or oil pressure sequencing switch failed. If not, fuel solenoid valve failed.

Continued

Table 4-4. Sequence of Events During Performance Check—Continued

Step	Condition	Power Unit Indication	Analyzer Indication	Remarks
6	Unit reaches approximately 10 percent governed speed, oil pressure sequencing switch actuates—Continued.		Ignition lamp illuminated.	If not, centrifugal multi-speed switch assembly 95 percent switch failed, or under frequency arming relay (K6) contacts failed.
		Ignition on. (Listen for audible cracking sound of ignition.)		If not, ignition unit failed.
			Fuel flows through primary fuel atomizer (flow divider blocks secondary flow).	
7	Engine lights off.		Exhaust gas temperature increases.	If not, improper acceleration limiter valve crack pressure, improper fuel spray (Atomizer-flow Divider), or obstructed air flow through engine.
8	Engine continues acceleration.		Control air pressure increases as follows: Approximately 2 psig at 25 percent governed speed, approximately 8 psig at 50 percent governed speed, approximately 32 psig at 100 percent governed speed.	If not, control air line leak, clogged control air pickup orifice, or faulty acceleration thermostat. Place finger over fuel control drain outlet, if control air pressure increases, acceleration limiter valve diaphragm failed.
			Fuel pressure increases.	If not, insufficient fuel supply or fuel control malfunction.
			Exhaust gas temperature increases.	If temperature drops off to less than 200°C (392°F) fuel atomizer may be clogged. If temperature remains high but engine does not accelerate, generator or other accessory may have failed. Compressor or turbine rub or plenum air leak, starter failure or low charged batteries.
9	Low oil pressure switch actuates.	No indication.	Engine oil pressure reaches approximately 45 psig.	If not, engine will shut down at 95 percent governed speed.
10	Engine reaches 35 percent governed speed.		K4 time delay and starter lamps extinguish.	If not, centrifugal multi-speed switch assembly 35 percent switch failed.
		Start relay (K1) de-actuates and start motor de-actuates.	DC voltage increases.	If not, start relay (K1) stuck closed.
11	Engine reaches 95 percent governed speed.	Centrifugal multi-speed switch assembly 95 percent switch actuates.		

Continued

Step	Condition	Power Unit Indication	Analyzer Indication	Remarks
11	Engine reaches 95 percent governed speed—Continued.	Ready to load lamp illuminates.	Ready to load and K6 under frequency lamps illuminate.	If not, centrifugal multi-speed switch assembly 95 percent switch failed.
		Ignition unit de-energized. Hourmeter activated.	Ignition lamp extinguishes.	If not, circuit breaker (CB-4) tripped, or hourmeter failed.
		Under frequency arming relay (K6) energizes to open circuit which bypasses low oil pressure switch during starting.		If not, diode (CR8) failed, or under frequency arming relay (K6) failed.
		Engine continues to run.		If not. low oil pressure switch failed to actuate.
			K7 400 lamp illuminates (K7 does not energize—no ground).	If not, under frequency arming relay (K6) contacts open, emergency switch (S5) contacts open or 400 Hz main contactor switch (S2) contacts open.
			K8 load contactor lamp illuminates (K8 does not energize—no ground).	If not, under frequency arming relay (K6) contacts open, emergency switch (S5) contacts open or 400 Hz main contactor switch (S3) contacts open.
12	Engine speed reaches about 102 percent governed speed (408 cps-governor controls speed of engine).		Fuel pressure drops to about 120-150 psi.	If not, and engine continues to accelerate to 110 percent and shuts off, governor malfunctioned.
				If not, and fuel pressure high, but engine operates slightly low in speed, and turbine temperature about 275-310°C (530 to 590°F) fuel atomizer or flow divider clogged.
				If not, and fuel pressure high and turbine discharge temperature more than 325°C (615°F) compressor or turbine rub, generator or other accessory failed, or plenum air leak.
		Exhaust gas temperature about 270°C-320°C (518°F-608°F) (Normal no-load exhaust gas temperature.)		If not, check exhaust gas temperature indicator calibration and circuit resistance (8 ohms).
		Control air pressure approximately 33 psig (depending on ambient conditions and load).		If not, check for control air leak in lines, ruptured acceleration limiter diaphragm, or thermostat.
				If not, control air inlet orifice clogged.

Table 4-4. Sequence of Events During Performance Check—Continued

Step	Condition	Power Unit Indication	Analyzer Indication	Remarks
12	Engine speed reaches 102 percent governed speed (408 cps-governor controls speed of engine).		Oil pressure 80 to 100 psig.	If not, low oil quantity pressure relief valve set low, oil pump failure, or oil filter dirty.
13	Place 400 Hz main contactor switch (S2) in CLOSE position.	Auxiliary stand-by start relay (K5) energized (to prevent standby start signal).	No indication.	If not, auxiliary standby start relay (K5) failed or 400 Hz main contactor switch (S2) contacts failed.
		400 Hz main contactor relay (K10) energizes, to supply voltage to environmental control system components.	No indication.	If not, power unit control panel trip indicator lamp extinguished, diode (CR6) failed, underfrequencing arming relay (K6) contacts failed, 400 Hz generator control relay (K7) contacts failed, 400 Hz generator control relay (K7) actuated by generator fault, or 400 Hz main contactor relay (K10) failed.
		400 Hz auxiliary main contactor relay (K9) energizes.	No indication.	If not, power unit control panel 400 Hz main contactor switch (S2) failed, 400 Hz main contactor relay (K10) contacts failed, 400 Hz auxiliary main contactor relay (K9) relay failed.
		Environmental control system can be operated. Hot water power supply armed. 400 Hz output contactor switch (S9) armed.		If not, 400 Hz auxiliary main contactor relay (K9) contacts failed or circuit breaker (CB5) failed.
14	Place 400 Hz output contactor switch in RESET position and hold.		K12 400 output contactor lamp illuminates.	If not, 400 Hz output contactor switch (S9) defective. Overload sensing control switch S10A, S10B, or S10C open.
		400 Hz output contactor relay (K12) energizes (indicated by no voltage from pin 1 positive to pin 2 negative standby receptacle J1).		If not, standby start relay (K2) failed.
		400 Hz ac convenience receptacle and power output receptacles energized.		
15	Release 400 Hz output contactor switch.	400 Hz main contactor relay (K10) remains energized.	K12 400 output contactor lamp stays illuminated.	If not, and environmental control components are also de-energized. There is probably a generator fault signal produced by connection of 400 Hz load.
				If not, but environmental control components remain energized, probably 400 Hz contactor switch (S9) failed or contacts of 400 Hz output contactor relay (K12) failed.

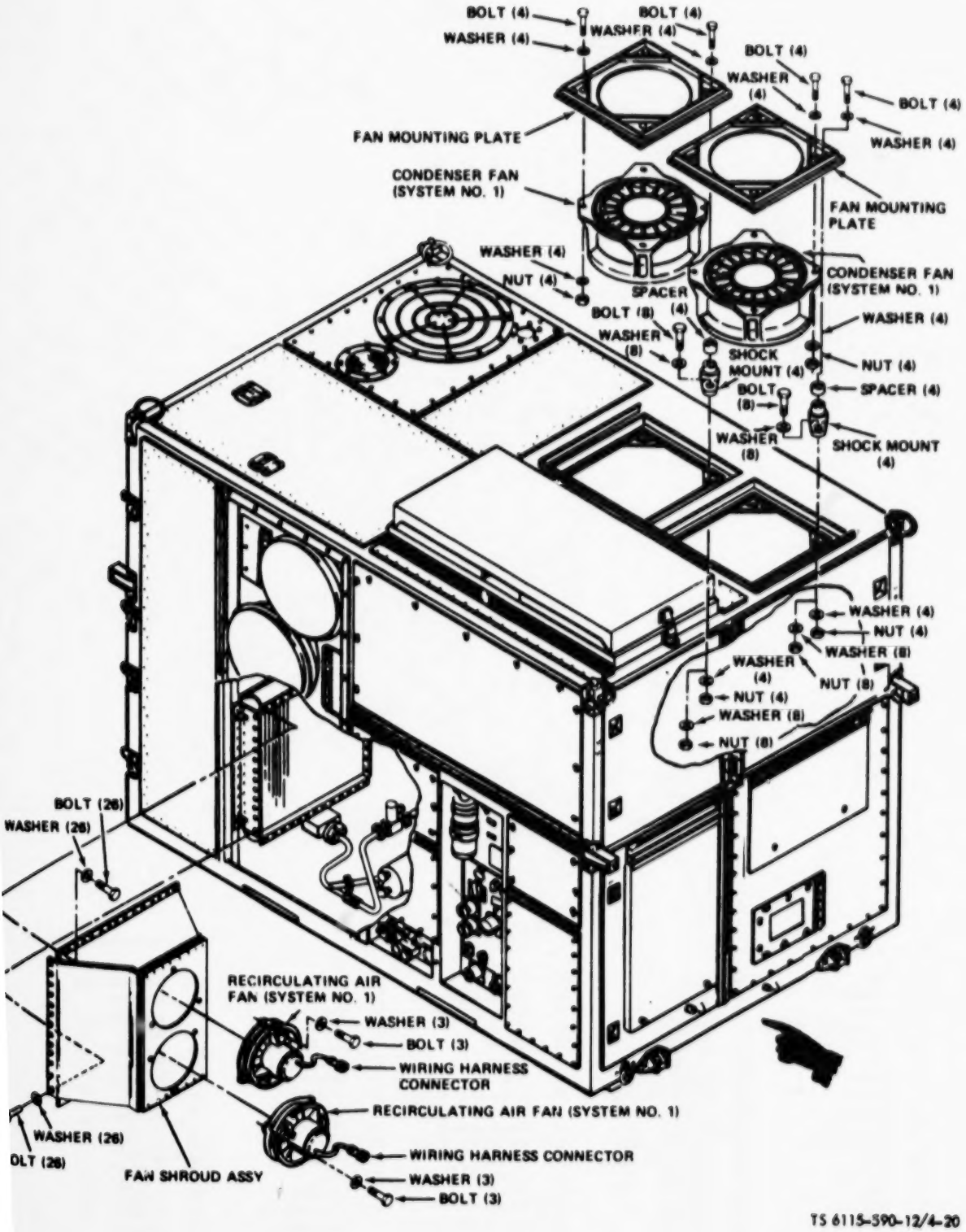
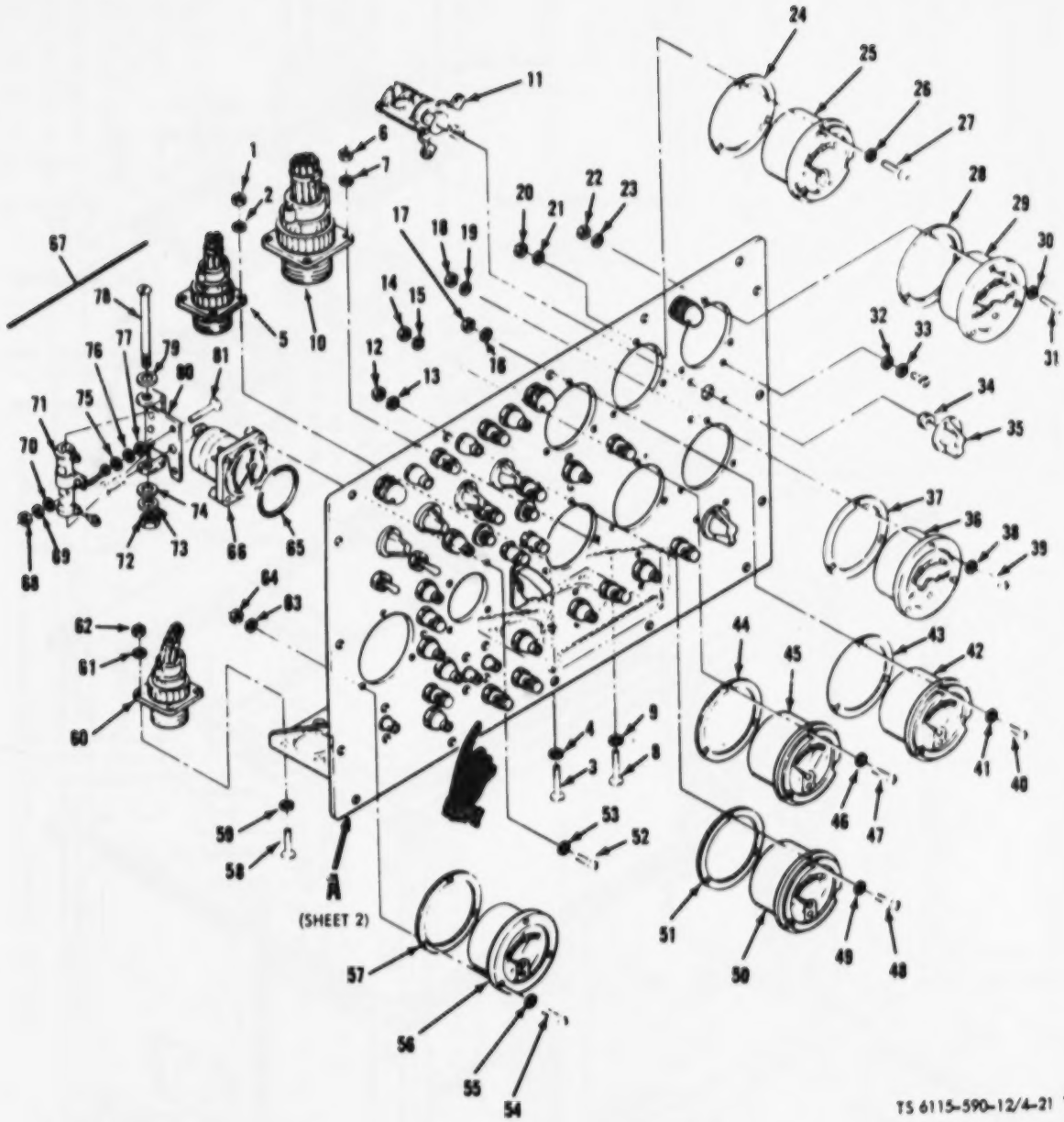
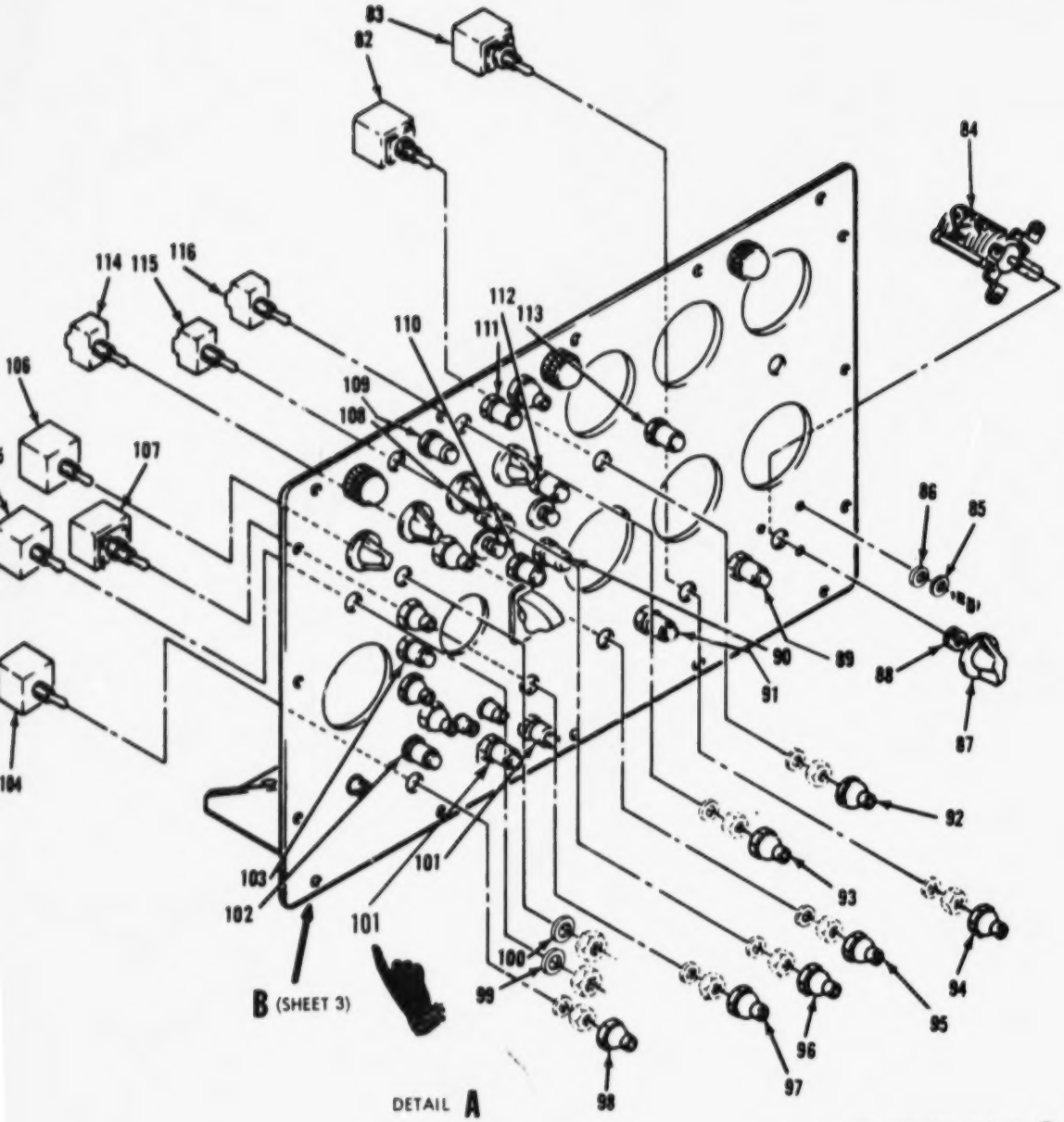


Figure 4-20. Cooled Air System Fan Replacement. (TS 6115-590-12 4-20).



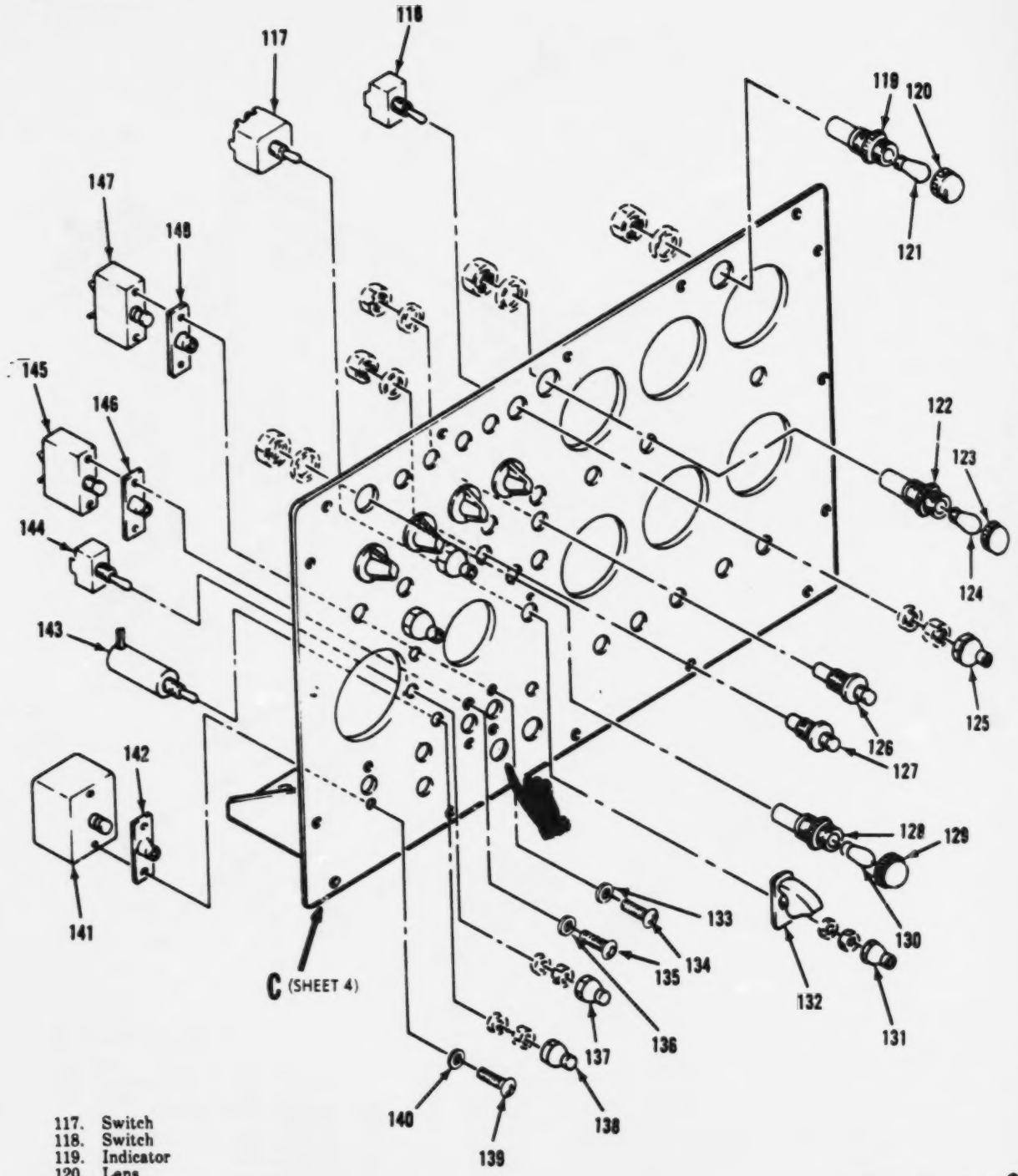
1. Nut	18. Nut	35. Knob	52. Screw	67. Resistor and bracket assembly
2. Washer	19. Washer	36. 400 Hz voltmeter	53. Washer	
3. Screw	20. Nut	37. Meter gasket	54. Screw	
4. Washer	21. Washer	38. Washer	55. Washer	68. Nut
5. Connector	22. Nut	39. Screw	56. DC Ammeter	69. Washer
6. Nut	23. Washer	40. Screw	57. Meter gasket	70. Washer
7. Washer	24. Meter gasket	41. Washer	58. Screw	71. Resistor
8. Screw	25. 60 Hz ammeter	42. 60 Hz freq. meter	59. Washer	72. Nut
9. Washer	26. Washer	43. Meter gasket	60. Connector	73. Washer
10. Connector	27. Screw	44. Meter gasket	61. Washer	74. Washer
11. Rotary switch	28. Meter gasket	45. 400 Hz ammeter	62. Nut	75. Washer
12. Nut	29. 60 Hz voltmeter	46. Washer	63. Washer	76. Washer
13. Washer	30. Washer	47. Screw	64. Nut	77. Nut
14. Nut	31. Screw	48. Screw	65. Packing	78. Bolt
15. Washer	32. Washer	49. Washer	66. Exhaust gas temperature indicator	79. Washer
16. Washer	33. Washer	50. 400 Hz freq. meter		80. Bracket
17. Nut	34. Grommet	51. Meter gasket		81. Screw

Figure 4-21. Instrument Panel Component Replacement (Sheet 1 of 4). (TS 6115-590-12/4-21[1]).



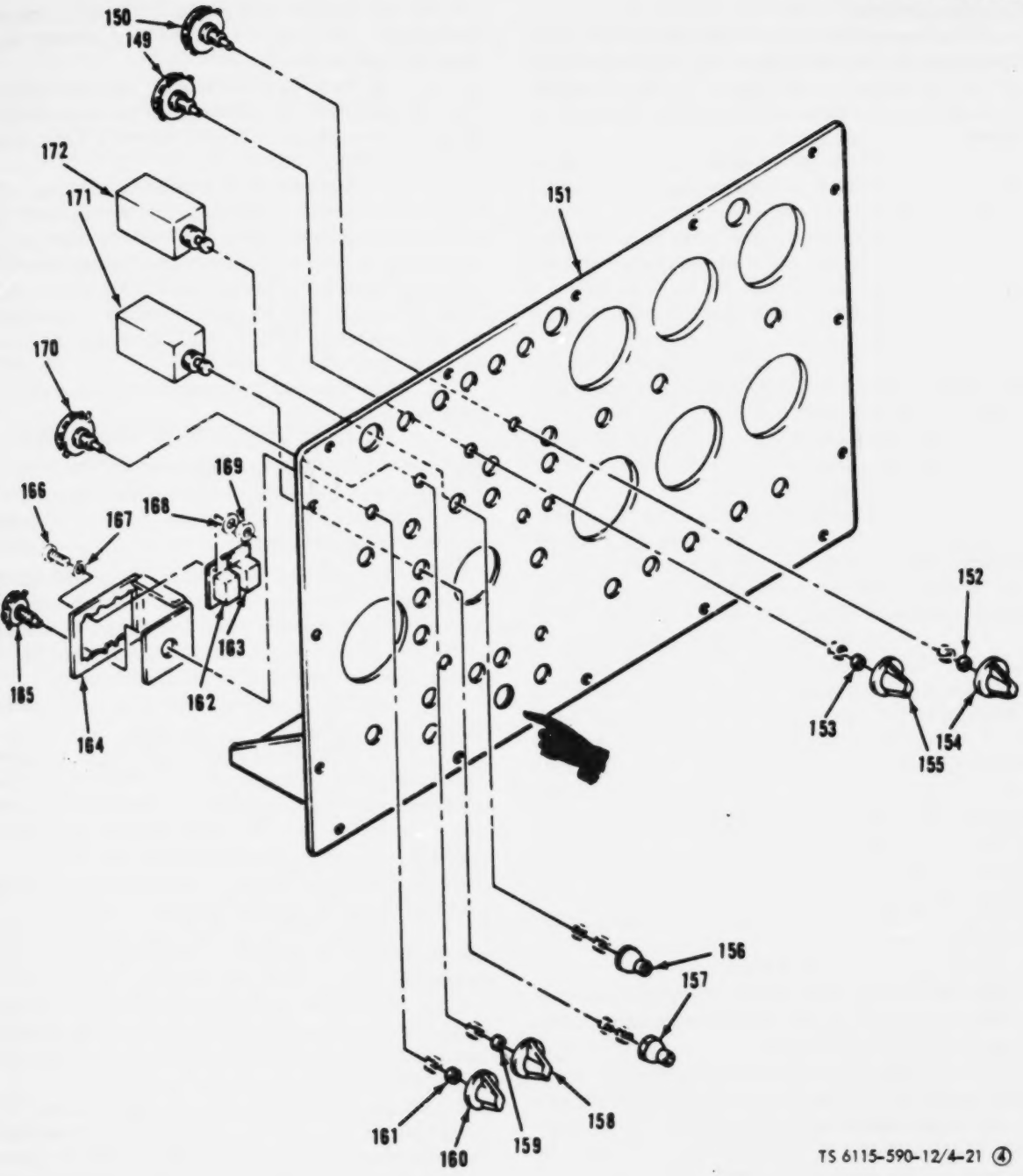
82. Switch
83. Switch
84. Rotary switch
85. Washer
86. Washer
87. Knob
88. Grommet
89. Indicator light
90. Indicator light
91. Indicator light
92. Boot
93. Boot
94. Boot
95. Boot
96. Boot
97. Boot
98. Boot
99. Washer
100. Washer
101. Indicator light [2]
102. Indicator light
103. Indicator light
104. Switch
105. Magnetic circuit breaker
106. Magnetic circuit breaker
107. Switch
108. Indicator light
109. Indicator light
110. Indicator light
111. Indicator light
112. Indicator light
113. Indicator light
114. Switch
115. Switch
116. Switch

Figure 4-21. Instrument Panel Component Replacement (Sheet 2 of 4). (TS 6115-590-12/4-21②).



117. Switch	129. Lens	134. Screw	139. Screw	144. Switch
118. Switch	130. Bulb	135. Screw	140. Washer	145. Circuit breaker
119. Indicator	131. Boot	136. Washer	141. Circuit breaker	146. Boot
120. Lens	132. Switchguard	137. Boot	142. Boot	147. Circuit breaker
121. Bulb	133. Washer	138. Boot	143. Switch	148. Boot
122. Indicator				
123. Lens				
124. Bulb				
125. Boot				
126. Push switch				
127. Push switch				
128. Indicator				

Figure 4-21. Instrument Panel Component Replacement (Sheet 3 of 4). (TS 6115-590-12/4-21③).



149.	Rotary switch	155.	Knob	161.	Grommet	167.	Washer
150.	Rotary switch	156.	Boot	162.	Relay	168.	Washer
151.	Panel	157.	Boot	163.	Relay	169.	Nut
152.	Grommet	158.	Knob	164.	Relay bracket	170.	Rotary switch
153.	Grommet	159.	Grommet	165.	Rotary switch	171.	Circuit breaker
154.	Knob	160.	Knob	166.	Screw	172.	Circuit breaker

Figure 4-21. Instrument Panel Component Replacement (Sheet 4 of 4). (TS 6115-590-12/4-21④).

e. Adjustments.

(1) Acceleration and overtemperature control thermostat. If the acceleration and overtemperature control thermostat is replaced, or if the controlling temperature is not as specified, check and adjust as follows.

(*a*) Connect gas turbine engine analyzer to power plant as described in paragraph 4-14b above except paragraph 4-14b (6).

(*b*) Disconnect line from load control thermostat. Connect a control air plumbing line from the load control thermostat line to the AIR IN fitting on the analyzer panel. Open needle valve on analyzer panel (fig. 4-14).

(*c*) Remove cap from acceleration limiter valve tee. Connect the 0-100 PSIG gauge set, provided with the analyzer, to the open leg of the tee.

(*d*) Open conditioned air outlet compartment access door (fig. 1-2) and refrigeration compartment access door (fig. 1-1).

(*e*) Start engine and accelerate to no load governed speed. Operate at this speed for approximately two minutes to stabilize operation.

(*f*) Operate both heated air system at full heat as described in figure 2-16.

(*g*) With heated air systems operating at full heat, place the mode select switch to COOL on both systems. The heated air flow control valves will remain open but the engine load control valve will close. Open the engine load control valve by installing a jumper between analyzer jacks identified LOAD VALVE and DC POWER. This condition bypasses the overtemperature thermoswitches in the air out compartment and delivers both cooled and heated air at the same time to provide sufficient engine load to raise the exhaust gas temperature to 1240° to 1260°F (671°C to 682°C) for checking the thermostat setting.

CAUTION

Monitor the air out temperature and shut down the power plant if air discharge temperature exceeds 200°F (93°C).

(*h*) With engine operating at full bleed load, slowly close needle valve (fig. 4-14) on gas turbine engine analyzer panel until the AIR IN pressure indicator drops to approximately 14 psig. The exhaust gas temperature at which engine speed and fuel pressure start to decrease is the acceleration and overtemperature control thermostat controlling temperature.

CAUTION

Do not permit exhaust gas temperature to exceed 1260°F (682°C).

(*i*) If controlling temperature is not 1240°F to 1260°F (671°C to 682°C) shut down power plant and adjust thermostat as follows.

(*j*) Remove thermostat by holding flats on thermostat valve (fig. 4-49) with a wrench and remove tube assembly.

(*k*) Remove one attaching bolt and washer, retainer plate and shim washers. Remove thermostat from turbine plenum flange. Remove thermostat valve from body.

(*l*) Measure total thickness of shims with micrometer. Add or remove shims as required. To decrease temperature setting, increase shim stack thickness. To increase temperature setting decrease shim stack thickness. A change of 0.001 inch in shim stack thickness will change controlling temperature by approximately 30°F. Install corrected thickness of shims and fitting.

(*m*) Reinstall thermostat in reverse order of removal.

(*n*) Recheck controlling temperature at least twice. When controlling temperature is satisfactory, reconnect load control thermostat line to load control valve. Disconnect and remove gas turbine engine analyzer.

(2) *Load control thermostat.* If the load control thermostat is replaced, or if the controlling temperature is not as specified, check and adjust as follows.

(*a*) Connect gas turbine engine analyzer to power plant as described in paragraph 4-14b.

(*b*) Load engine as described in steps e.(1) (e), (f) and (g) above.

(*c*) Observe engine exhaust gas temperature on analyzer. The load control thermostat should modulate the load control valve to control exhaust gas temperature at 1025°F to 1075°F (552°C to 579°C). If control temperature is not 1025°F to 1075°F (552°C to 579°C), shut down power plant and adjust thermostat as follows.

(*d*) Remove thermostat by holding flats on thermostat valve with a wrench and remove tube assembly.

(*e*) Remove one attaching bolt and washer, retainer plate and shim washers. Remove thermostat from turbine plenum flange. Remove thermostat valve from body.

(*f*) Measure total thickness of shims with micrometer. To decrease temperature setting, increase shim stack thickness. To increase temperature setting, decrease shim stack thickness. A change of 0.001 in shim stack thickness will change cracking temperature by approximately 30°F. Add or remove shims as required. Install correct thickness of shims and fitting.

(*g*) Reinstall thermostat in reverse order of removal.

(*h*) Recheck controlling temperature at least twice.

(*i*) When controlling temperature is satis-

factory, shut down power plant and disconnect and remove analyzer.

(3) Fuel control assembly acceleration limiter valve cracking pressure adjustment. If the fuel control assembly is replaced, or if the acceleration limiter valve cracking pressure is not within specified limits, check and adjust as follows:

(*a*) Disconnect fuel line at atomizer and install the portable 0-100 psi pressure gauge.

(*b*) Disconnect control air line at acceleration limiter valve tee.

(*c*) With fuel supplied to fuel control assembly at 15 psig, move master switch (S1) (fig. 2-11, sheet 1 of 2) on power plant instrument panel assembly to START position and motor engine.

CAUTION

Do not exceed starter motor duty cycle.

(*d*) While motoring unit, check cracking pressure. Cracking pressure should be 44 $\pm$ 1 psig. To adjust, hold acceleration limiter valve adjustment screw (fig. 4-16) on fuel control assembly and loosen locknut. Adjust screw position using screwdriver and wrench assembly (special tools). To increase cracking pressure turn acceleration limiter valve adjustment screw clockwise. To decrease pressure, turn adjustment screw counterclockwise.

CAUTION

Do not turn adjusting screw more than three full turns in either direction.

(*e*) When satisfactory cracking pressure is attained, tighten locknut.

(*f*) Reconnect control air pressure line to acceleration limiter valve. Remove gauge from tee on fuel control assembly, reconnect fuel line, disconnect and remove gas turbine engine analyzer.

(4) Fuel control assembly governor speed setting. If fuel control assembly is replaced or if engine speed at full load or at no load is not as specified, check and adjust as follows.

(*a*) Connect gas turbine engine analyzer to power unit as described in paragraph 4-14b. Use tach-generator rpm gauge (fig. 4-14) on analyzer panel to check engine speed.

(*b*) Start engine (fig. 2-11) and accelerate to no load governed speed. Operate at this speed for approximately two minutes to stabilize operation.

(*c*) Apply full load to engine. To apply load, open compressed air outlet as described in fig. 2-18 and operate cooled air system as described in para. 2-15.

(*d*) With engine operating at full load, tach-generator rpm gauge (fig. 4-14) should read 4150 $\pm$ 10 rpm (equal to an engine speed of 40,700 $\pm$ rpm).

(*e*) If tach-generator rpm gauge does not read 4150 $\pm$ 10 rpm use screwdriver and wrench assembly (special tools) to adjust full load governed speed.

(*f*) Hold governor adjustment screw (fig. 4-16) on fuel control assembly and loosen locknut. Turn governor adjustment screw clockwise to increase full load governed speed, and counterclockwise to decrease full load governed speed. When adjustment is satisfactory, tighten locknut.

CAUTION

Do not turn screw more than three turns in either direction.

(*g*) Close compressed air outlet as described in fig. 2-18, shut off cooled air system as described in figure 2-15, and return the engine to no load governed speed.

(*h*) Tach-generator rpm gauge (figure 4-14) should read 4242 rpm (maximum) (equal to an engine speed of 41,600 rpm).

(*i*) If tach-generator rpm gauge does not read 4242 rpm (maximum), use screwdriver and wrench assembly (special tools) to adjust no load governed speed setting.

(*j*) Hold governor adjustment screw (figure 4-16) on fuel control assembly and loosen locknut. Turn adjustment screw clockwise to increase no load governed turn adjustment screw counterclockwise to decrease no load governed speed.

(*k*) When adjustment is satisfactory, tighten locknut, disconnect and remove gas turbine engine analyzer.

(5) *Air pressure regulator.* If air pressure regulator is replaced or if controlling air pressure is not as specified, check and adjust as follows.

(*a*) Disconnect outlet air pressure line from air pressure regulator and connect a line between the air pressure regulator outlet port and the AIR in connection (fig. 4-14) on gas turbine engine analyzer.

(*b*) Start and accelerate engine to no load governed speed. Read air pressure regulator outlet pressure on AIR gauge on analyzer panel.

(*c*) Air pressure regulator outlet pressure shall be 19.0 to 20.0 psig.

(*d*) If pressure is not as specified, shut down engine. Loosen locknut on end of air pressure regulator and turn adjustment screw clockwise to increase outlet pressure. Tighten locknut.

(*e*) Repeat check procedure until satisfactory adjustment is made. Disconnect and remove gas turbine engine analyzer.

(6) *Centrifugal Multi-Speed Switch Setting.* If the centrifugal multi-speed switch is replaced or if

settings are not as specified, check and adjust as follows.

(*a*) Connect gas turbine engine analyzer to power unit as described in paragraph 4-14b. Control engine speed with valve on analyzer panel (fig. 4-14).

(*b*) Use tach-generator rpm gauge on analyzer panel to read engine speed.

(*c*) Start and operate engine as described in paragraph 4-14d checking for switch actuation of centrifugal multi-speed switch.

(*d*) If 35 percent switch requires adjustment, remove cover plate from centrifugal multi-speed switch and adjust position of top screw (screw farthest from switch receptacle). Replace cover plate and recheck switch setting at least twice.

NOTE

If 35 percent switch setting is changed, the settings of the 95 percent speed switch and the overspeed (110 percent) switch must be checked.

(*e*) If the 95 percent speed switch requires adjustment, remove cover plate from centrifugal multi-speed switch and adjust position of middle screw. Replace cover plate and recheck switch setting at least twice.

(*f*) To check actuation of overspeed (110 percent) switch, use screwdriver and wrench assembly (special tools); loosen locknut and turn fuel control assembly governor adjusting screw two full turns clockwise to increase governor setting. Start engine and use needle valve (fig. 4-14) on analyzer panel to slowly accelerate to overspeed condition. Overspeed (110 percent) switch should actuate to shut down engine at 4512 $\pm$ 25 tach-generator rpm reading (equal to an engine speed of 44,250 $\pm$ 250 rpm).

(*g*) If overspeed (110 percent) switch requires adjustment, remove cover plate and adjust position of bottom screw (screw nearest to receptacle). Replace cover plate and recheck switch setting at least twice.

(*h*) When all switch settings are satisfactory, reset fuel control assembly governor screw to original position.

(*i*) Recheck fuel control assembly governor setting as described in paragraph 4-14e (4).

(*j*) When centrifugal multi-speed switch checks and fuel control assembly governor setting checks are satisfactory, disconnect and remove gas turbine engine analyzer.

Section VII. Radio Interference Suppression

4-15. General Methods Used to Attain Suppression

Essentially, suppression is attained by providing a low resistance path to ground for the stray currents. The methods used include shielding the ignition and high frequency wires, grounding the frame with bonding straps, and using capacitors and resistors.

4-16. Interference Suppression Components

a. Primary Suppression Components. The primary suppression components are those whose primary function is to suppress radio interference. These components are illustrated in fig. 4-17.

b. Secondary Suppression Components. These components have radio interference suppression functions which are incidental or secondary to their primary function.

4-17. Replacement of Suppression Components

Refer to fig. 4-17 and replace the radio interference suppression components.

4-18. Testing of Radio Interference Suppression Components

Test the capacitors for leaks and shorts on a capacitor tester; replace defective capacitors. If test equipment is not available and interference is indicated, isolate the cause of interference by the trial-and-error method of replacing each capacitor in turn until the cause of interference is located and eliminated.

Section VIII. Maintenance of Power Plant Assembly Installation and Stowed Components

4-19. General.

This section details the maintenance of the power plant assembly authorized for organizational level. The power plant assembly consists of all stowable items such as external fuel filters, air conditioning ducts, hoses, electrical cables and inflation ejector which connect the power plant to the inflatable shelter.

4-20. Dual Water Hose Assembly.

a. General. The dual water hose assembly (fig. 1-15, sheet 3 of 7) connects the hot and cold water

utlets of the power plant water system to other ements of the MUST system. The two hoses are eated by a thermostatically controlled heater that is owered from the 400 Hz electrical system of the ower plant.

b. Inspection. Visually inspect the dual water ose assembly for damage, signs of leakage, stripped crossed threads on coupling nuts and electrical nnectors, missing or damage protective cap or lugs.

(1) Test the heater by applying 400 Hz, 120 AC. Connector pin arrangement is as follows: pin ; spare, pin B; spare, pin C: 400 Hz, 120 VAC hase), pin D: 400 Hz, 120 VAC (neutral), pin E: round.

(2) Test for leaks at 100 PSI water pressure.

c. Replacement. The dual water hose assembly is eplaced by simply disconnecting it from the hot and old water outlets.

21. Supply and Drain Water Hose Assembly.

a. General. The supply and drain water hose sembly is used for connecting an external water urce to the power plant water system. The hose is eated by a thermostatically controlled heater that is owered by the 400 Hz electrical system of the power ant.

b. Inspection. Visually inspect hose assembly for mage, signs of leakage, stripped or crossed reads, missing or damaged plugs or protective ps. Inspect heated flap of water recirculating hose sembly for visible damage.

(1) Test the heaters with 400 Hz, 120 VAC. nnector pin arrangement is: pin A, spare; pin B, are; pin C, 400 Hz, 120 VAC; phase, pin D, 400 z, 120 VAC (neutral); pin E, ground.

(2) Test for leaks in hoses at 75 PSI water essure.

c. Replacement. The supply and drain water hose sembly is replaced by simply disconnecting it from e water inlet and drain fittings.

22. Power Cable Assemblies, 60 and 400 Hz

a. General. The 60 and 400 Hz power output cable emblies (fig. 1-15, sheet 2 of 7) are used to nect the power plants 60 and 400 Hz electrical erating systems to other elements of the MUST pital.

WARNING

Make sure power plant is shut down prior to eplacing cables.

Replacement. To replace the 60 and 400 Hz er cable assemblies, disconnect and remove.

Inspection. Visually inspect the cable emblies for damaged connectors, connector covers, sleeves or cables. If damage is evident notify general support maintenance for repair.

4-23. External Fuel Filter/Separator and Hose Assemblies

a. Disassembly and Removal of Canister and Filter Element.

(1) Loosen nuts and washers (fig. 3-1) until each nut is flush with the end of bolt. Each bolt can then be raised and rotated 180 degrees so the flanged portion of the bolt head is clear of cover.

(2) Remove cover and discard gasket. Remove screws, washers and the filter canister bracket assembly. Then remove filter element from tank and remove aluminum plug.

(3) Remove canister from tank, then remove grommet and standpipe from the canister.

b. Inspection. Inspect the filter/separator and the frame of the skid for damage to the extent that welding may be required.

WARNING

All flammable vapors and excess fluid must be removed prior to cleaning or welding.

c. Cleaning.

(1) Steam clean or wash all exterior surfaces of the filter/separator with a solution of 6 oz. of trisodium phosphate, Specification O-T-071, per gallon of water. After cleaning, rinse thoroughly and dry. Parts may be cleaned more thoroughly by immersing or wiping with cleaning solvent, Federal Specification P-D-680.

WARNING

Dry cleaning solvent, P-D-680 or P-S-661 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F. (38°C).

d. Welding and Repair. Welding to be performed by experienced aluminum welder only. Clean and prepare the area requiring weld by the following methods in sequence.

(1) Chip out old weld or "V" out cracked area and stop drill if necessary.

(2) Wash and degrease area with deoxidizing agent and detergent to remove dirt, oil film and oxides.

(3) Brush with stainless steel wire brush until all foreign material is removed and metal becomes very bright.

e. Assembly of Canister and Filter Element.

CAUTION

Make certain the grommet is properly seated around the canister. The grommet should cover the mesh screen.

(1) Install the grommet on the standpipe. Place the canister over the standpipe and press canister into the grommet. Press the canister assembly over the outlet pipe until the grommet is seated to the shoulder of the inlet pipe.

NOTE

The outlet pipe is the higher pipe of the two within the tank.

(2) Install the aluminum plug in one end of the filter element. Place the opposite end of the element over the inlet pipe and press down until the bottom makes contact with the shoulder of the inlet pipe.

CAUTION

The bracket assembly is not intended to seat on the welded projections inside the housing. Do not attempt to seat the bracket assembly to the projections as this will result in damage to the canister.

(3) Position the bracket assembly over the projections inside of the tank. Install washers and screws.

(4) Insert the cover gasket in the groove of the cover.

(5) Center the cover over the tank.

(6) Raise the four bolts and rotate until the flanged portion of the bolt is over the cover. Tighten the nuts uniformly.

f. Removal and Disassembly of Sight Gauge (fig. 4-18).

(1) Remove two screws and washers from sight gauge body.

(2) Remove sight gauge body and gasket from tank. Discard gasket.

CAUTION

As the sight gauge body is removed from the housing, it is possible for the float ball to be dropped from the body and become lost.

g. Cleaning and Inspection.

(1) Wash sight gauge ball and body in clean fuel.

(2) Check sight gauge body for cracks.

h. Reassembly and Installation.

(1) Be sure the sight gauge block on the side of the tank is clean and free of any deposits that might have been left from the old gasket.

(2) Place two washers over screws. Insert in sight gauge body, place over screws and place ball in sight gauge body.

(3) With the filter/separator in an upright position, position the sight gauge body on the tank making contact at the bottom first to prevent the ball from falling out of the body. Tighten screws evenly.

i. Removal of Inlet and Outlet Valves (fig. 4-18).

(1) Disconnect the pump discharge hose from the camlock fitting on the inlet valve and insert dust plug to prevent dust and foreign material from entering the valve body.

(2) Remove filter/separator discharge hose from outlet valve, place dust cap over fitting and engage camlocks.

(3) With the skid firmly held down, select a wrench of the proper size to fit the octagon shoulder on the valves. Turn the valves counterclockwise to remove them from the inlet and/or outlet tubes.

j. Installation of Inlet and Outlet Valves. Install inlet and outlet valves to tank outlet tubes in reverse order of removal.

k. Disassembly of Inlet and Outlet Valves (fig. 4-19). The inlet and outlet valves are identical ball-type valves having a 90 degree rotation of the handle from the OFF to the ON positions. These valves are designed to permit replacement of the ball and stem.

(1) Remove four bolts (1) and nuts (2), and remove the two pipe ends (3).

(2) Remove the two body seals (4) and two seats (5).

(3) Remove the ball (6) by tipping the bottom of the ball outward to disengage from the valve stem (7) and permit removal from the body (8).

(4) To disassemble the valve stem, remove stem nut (9), handle (10) from valve stem, then remove retainer nut (11).

(5) Lift off Bellville washers (12), stem seal follower (13) and stem seal (14).

(6) The valve stem can then be removed from the inside of the body. Thrust bearing (15) should come out with the stem.

l. Cleaning, Inspection and Repair.

(1) Clean all parts by washing in clean fuel and inspect all components. If any of the seals are scored or torn, replace.

(2) Inspect the ball and valve body for scoring. If either of these components are scored, replace the scored part.

m. Reassembly.

(1) Place thrust bearing (15) on the valve stem and insert stem into valve body (8).

(2) Install the stem seal (14) and the stem seal follower (13).

(3) Install the Bellville washers (12) and retainer nut (11).

NOTE

Tighten the retainer nut just enough to exert a slight compression on the stem seal.

(4) Install handle (10) and stem nut (9) and tighten nut. Check handle for freedom of movement.

(5) To reassemble the valve body, place the ball (6) into body (8) making certain the groove in

he ball seats around the bar on stem (7). Install ball eats (5) and seals (4). Install the four bolts (1), nuts 2) and tighten uniformly.

(6) Check valve for freedom of movement and einstall on tank.

(7) Fill the tank with fuel and check for leaks round the valves and inlet and outlet pipes. If leaks xist, tighten the valve on the pipe. If the ball valve eaks around the stem, loosen the stem nut and ighten the retainer nut until leak stops; then tighten he stem nut.

n. Water Drain Valve. The water drain valve (fig. -18) is similar to the inlet and outlet valves, except hat it is a ½ inch rather than a 1 inch valve. Refer to aragraphs 4-23i through 4-23m for maintenance nstruction.

o. Pressure Vent Valve. The manual pressure ent valve (fig. 4-18) requires no maintenance. In the vent of a malfunction, remove and replace the alve.

p. External Fuel Hose Assemblies. Visually nspect hose assemblies for damage, signs of eakage, stripped or crossed threads, missing or lamaged plugs or protective caps.

1-24. 400 Hz Remote Power Cable Assembly

a. General. The 400 Hz Auxiliary Power Cable Assembly (fig. 1-15, sheet 2 of 7) is used for connecting between two power units for remote operation of ventilating fans.

b. Inspection. Visually inspect the cable assembly for damaged connectors, connector covers, sleeves or cables.

c. Test and Replacement. Test individual wires for continuity. Replace cable assembly if inspection and/or test reveals damage or lack of continuity in wires.

1-25. DC Electrical Power Standby Cable Assembly

a. General. The standby cable assembly (fig. 1-15, sheet 1 of 7) is used to connect the 24V DC systems of two power units together to provide for standby operation of one power plant.

b. Inspection. Visually inspect the cable assembly or damaged connectors, connector covers, sleeves or ables.

c. Test and Replacement. Test individual wires or continuity. Replace cable assembly if inspection nd/or test reveals damage or lack of continuity in ires.

-26. External DC Electrical Power Input Cable Assembly

a. General. The DC power input cable assembly g. 1-15, sheet 1 of 7) is used for connection to an ternal 24V DC power source.

b. Inspection. Visually inspect the cable assembly for damaged connectors, connector covers, sleeves or cables.

c. Test and Replacement. Test individual wires for continuity. Replace cable assembly if inspection and/or test reveals damage or lack of continuity in wires.

4-27. External Battery DC Power Cable Assembly

a. General. The DC power input cable assembly (fig. 1-15, sheet 1 of 7) is used to connect to an external battery in a military vehicle equipped with a 24V DC output receptacle to the power unit for auxiliary starting power.

b. Inspection. Visually inspect cable assembly for damaged connector, lugs, adapters or cable.

c. Test and Replacement. Test the continuity of the two wires. Replace cable assembly if inspection and/or test reveals damage or lack of continuity of individual wires.

4-28. Water Recirculating Hose Assembly

a. General. The water recirculating hose assembly (fig. 1-15, sheet 6 of 7) permits the circulation of water to prevent freezing.

b. Replacement. The recirculating hose assembly is replaced by simply disconnecting it.

c. Inspection. Visually inspect hose assembly for damage, signs of leakage, stripped or crossed threads, missing or damaged plugs or protective caps. Inspect heated flat for visible damage.

4-29. Vacuum Hose Assembly

a. General. The vacuum hose assembly (fig. 1-15, sheet 5 of 7) connects the power plant vacuum outlet to elements of the MUST system that require vacuum service.

b. Replacement. The vacuum hose assembly is replaced by simply disconnecting it.

c. Inspection. Visually inspect hose assembly for damaged or crossed threads or other evidence of damage.

4-30. Compressed Air Hose Assembly

a. General. The compressed air hose assembly (fig. 1-15, sheet 3 of 7) connects the inflation ejector assembly to the power plant compressed air outlet.

b. Replacement. The compressed air hose assembly is replaced by simply disconnecting it.

c. Inspection. Visually inspect hose assembly for damaged or crossed threads or other evidence of damage.

4-31. Inflation Ejector Assembly

a. Inspection

(1) Visually inspect threaded parts for damaged, stripped or crossed threads.

(2) Visually inspect ejector tube for cracks, bonds and broken welds. Check that wire mesh in the tube is not torn or clogged. Check for loose rivets.

b. Replacement. The inflation ejector assembly is replaced by simply disconnecting it.

4-32. Condenser Cooling Fan, Fan Mounting Plate and Shock Mount

a. Removal (fig. 4-20).

(1) Remove wiring harness connector from fan. Remove four (4) attaching bolts, eight (8) washers and four (4) nuts. Remove fan and fan mounting plate from power plant.

(2) Remove four (4) attaching bolts, eight (8) washers and four (4) nuts and remove fan from mounting plate.

(3) Remove two (2) attaching bolts, four (4) washers and two (2) nuts from shock mount from power unit.

b. Inspection. Visually inspect fan assembly for damaged frame, deformed blades, damaged connectors or other evidence of damage.

c. Installation.

(1) Install replacement cooling fan in reverse order of removal procedure.

(2) Reconnect wiring harness connector to fan.

4-33. Recirculating Air Fan and Shroud Assembly

a. Removal (fig. 4-20).

(1) Remove wiring harness connector from recirculating fan. Remove three bolts and washers attaching fan to shroud assembly and remove fan from power unit.

(2) Remove 52 attaching bolts and washers from shroud assembly, separate from evaporator and remove from power unit.

b. Inspection. Visually inspect fan assembly for damaged frame, deformed blades, damaged connectors or other evidence of damage.

c. Installation.

(1) Install replacement recirculating fan assembly and shroud in reverse order of removal procedure.

(2) Reconnect wiring harness to fan.

Section IX. Maintenance of Power Plant Electrical Installation

4-34. Instrument Panel Assembly

WARNING

The power plant shall not be operating when maintenance on electrical components is being performed, and the power plant shall not be connected to another power unit that is operating.

NOTE

When access for the removal of individual components is desired, extend the upper part of the panel outward with the lower part of the panel resting on the lower recessed edge of the panel frame without a strain on the wiring harness. Reference designations for parts given in the following text are marked on the back of the instrument panel and shows on the diagram.

a. Wiring Harness

(1) *Removal (fig. 4-21).*

(*a*) Tag and remove wiring harness electrical leads to components.

(*b*) Remove hardware, items 1 through 10 and 58 through 62 to remove wire harness and connectors (5, 10, 60).

(2) *Cleaning and Inspection.*

(*a*) Clean wiring harness with filtered compressed air and an electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect wiring harness for burned, bent, loose, corroded, and otherwise damaged connector pins and terminals. Inspect wiring for breaks, burned, chafed, or deteriorated insulation and other obvious damage.

(3) *Installation.* Install wiring harness in reverse order of removal procedures.

b. DC Ammeter (M2).

(1) *Removal.*

(*a*) If wiring harness has not been removed, tag and disconnect electrical leads to DC ammeter (56).

(*b*) Remove hardware (54,55,63,64), then remove DC ammeter and meter gasket (57).

(2) *Cleaning and Inspection.*

(*a*) Clean DC ammeter with filtered compressed air and an electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect DC ammeter for corrosion, cracked case or glass, damaged threads and other evidence of damage.

(3) *Installation.* Install DC ammeter in reverse order of removal procedures.

c. 400 Hz Frequency Meter (M3).

(1) *Removal.*

(*a*) If wiring harness has not been removed, tag and disconnect electrical leads to 400 Hz frequency meter (50).

(*b*) Remove hardware (12,13,48,49), then remove 400 Hz frequency meter and gasket (51).

(2) *Cleaning and Inspection.*

(*a*) Clean 400 Hz frequency meter with tered compressed air and an electrician's brush or ipe with a clean rag lightly moistened with an pproved cleaning solvent.

(*b*) Visually inspect 400 Hz frequency eter for corrosion, cracked case or glass, damaged reads and other evidence of damage.

(3) *Installation.* Install 400 Hz ammeter in verse order of removal procedures.

d. 400 Hz Ammeter (M4).

(1) *Removal.*

(*a*) If wiring harness has not been moved, tag and disconnect electrical leads to 400 z ammeter (45).

(*b*) Remove hardware (14,15,46,47), then move 400 Hz ammeter and gasket (44).

(2) *Cleaning and Inspection.*

(*a*) Clean 400 Hz ammeter with filtered mpressed air and an electrician's brush or wipe ith a clean rag lightly moistened with an approved eaning solvent.

(*b*) Visually inspect 400 Hz ammeter for rrosion, cracked case or glass, damaged threads d other evidence of damage.

(3) *Installation.* Install 400 Hz ammeter in verse order of removal procedures.

e. 400 Hz Voltmeter (M5).

(1) *Removal.*

(*a*) If wiring harness has not been moved, tag and disconnect electrical leads to 400 z voltmeter (36).

(*b*) Remove hardware (18,19,38,39), then move 400 Hz voltmeter and gasket (37).

(2) *Cleaning and Inspection.*

(*a*) Clean 400 Hz voltmeter with filtered mpressed air and an electrician's brush or wipe th a clean rag lightly moistened with an approved aning solvent.

(*b*) Visually inspect 400 Hz voltmeter for rosion, cracked case or glass, damaged threads d other evidence of damage.

(3) *Installation.* Install 400 Hz voltmeter in erse order of removal procedures.

60 Hz Frequency Meter (M8).

(1) *Removal.*

(*a*) If wiring harness has not been oved, tag and disconnect electrical leads to 60 Hz quency meter (42).

(*b*) Remove hardware (16,17,40,41), then ove 60 Hz frequency meter and gasket (43).

(2) *Cleaning and Inspection.*

(*a*) Clean 60 Hz frequency meter with red compressed air and an electrician's brush or with a clean rag lightly moistened with an oved cleaning solvent.

(*b*) Visually inspect 60 Hz frequency meter for corrosion, cracked case or glass, damaged threads, and other evidence of damage.

(3) *Installation.* Install 60 Hz frequency meter in reverse order of removal procedures.

g. 60 Hz Ammeter (M6).

(1) *Removal.*

(*a*) If wiring harness has not been removed, tag and disconnect electrical leads to 60 Hz ammeter (25).

(*b*) Remove hardware (20,21,26,27), then remove 60 Hz ammeter and gasket (24).

(2) *Cleaning and Inspection.*

(*a*) Clean 60 Hz ammeter with filtered compressed air and an electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect 60 Hz ammeter for corrosion, cracked case or glass, damaged threads and other damage.

(3) *Installation.* Install 60 Hz ammeter in reverse order of removal procedures.

h. 60 Hz Voltmeter (M7).

(1) *Removal.*

(*a*) If wiring harness has not been removed, tag and disconnect electrical leads to 60 Hz voltmeter (29).

(*b*) Remove hardware (22,23,30,31), then remove 60 Hz voltmeter and gasket (28).

(2) *Cleaning and Inspection.*

(*a*) Clean 60 Hz voltmeter with filtered compressed air and an electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect 60 Hz voltmeter for corrosion, cracked case or glass, damaged threads and other evidence of damage.

(3) *Installation.* Install 60 Hz voltmeter in reverse order of removal procedures.

i. Exhaust Gas Temperature Indicator (M9).

(1) *Removal.*

(*a*) If wiring harness has not been removed, tag and disconnect electrical leads to exhaust gas temperature indicator (66).

(*b*) Remove screws (52) and washers (53), then remove indicator (66) with attached resistor bracket assembly (67) and packing (65).

(*c*) Remove two screws attaching resistor bracket assembly to exhaust temperature indicator. If repair of resistor bracket is necessary, remove hardware (items 68 through 81) to remove resistor thermocouple assembly (71) from bracket (80).

(2) *Cleaning and Inspection.*

(*a*) Clean exhaust gas temperature indicator with filtered compressed air and an electri-

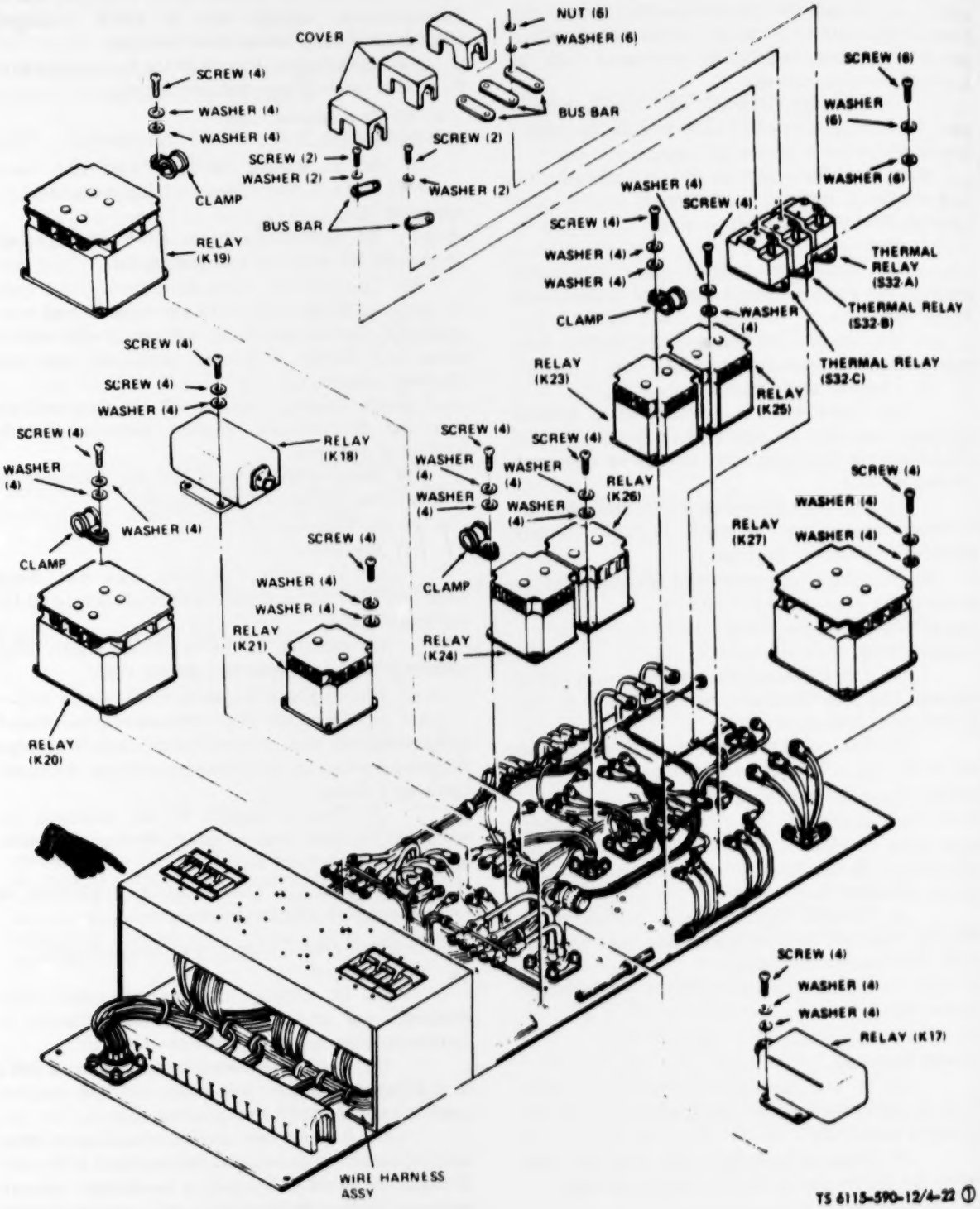


Figure 4-22. Conditioned Air System Circuit Breaker and Control Panel Component Replacement (Sheet 1 of 3) (TS 6115-590-12/4-22[1]).

's brush or wipe with a clean rag lightly stened with an approved cleaning solvent.

(*b*) Visually inspect exhaust gas tempera- indicator for corrosion, cracked case or glass, naged threads, and other damage.

(3) *Installation.* Install exhaust gas indicator everse order of removal procedures.

Rotary Switch (S25).

(1) *Removal.*

(*a*) If wiring harness has not been oved, tag and disconnect electrical leads to ry switch (11).

(*b*) Loosen setscrew in knob (35) and ove knob and grommet (34). Remove four screws nished as hardware with switch), lockwashers and flat washers (32) from rotary switch, then ove rotary switch.

(2) *Cleaning and Inspection.*

(*a*) Clean rotary switch with filtered com- ssed air and an electrician's brush or clean rotary tch with approved cleaning solvent and electri- n's brush.

(*b*) Visually inspect rotary switch for rosion, cracks, damaged threads, proper align- nt and other evidence of damage.

(3) *Installation.* Install rotary switch in erse order of removal procedures.

. Rotary Switch (S26).

(1) *Removal.*

(*a*) If wiring harness has not been noved, tag and disconnect electrical leads to ary switch (84), S26.

(*b*) Loosen setscrew in knob (87) and nove knob and grommet (88). Remove four screws nished as hardware with switch), lockwashers) and flat washers (86) from rotary switch (84), n remove rotary switch.

(2) *Cleaning and Inspection.*

(*a*) Clean rotary switch with filtered com- ssed air and an electrician's brush or clean rotary itch with an approved cleaning solvent and elec- ian's brush.

(*b*) Visually inspect rotary switch for rosion, cracks, damaged threads, proper align- nt and other evidence of damage.

(3) *Installation.* Install rotary switch in erse order of removal procedures.

Indicator Lights (DS1, DS2, DS3, DS4, DS5, 7, DS8, DS12, DS19, DS23, DS24, DS25, and DS26).

(1) Removal.

(a) If wiring harness has not been oved, tag and disconnect electrical leads to indi- r lights (108,109,110).

(b) Remove nut and washer from each indi- r light and remove indicator lights.

NOTE

Indicator light DS3 (110) is identical to the other twelve indicator lights except that it has a green lens rather than a red lens. Be sure that indicator light DS3 is reinstalled at the correct location on the panel "ready to load" indicator.

(2) *Cleaning and Inspection.*

(*a*) Clean lamp assembly with filtered compressed air and an electrician's brush or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect lamp assembly for corrosion, cracks, damaged threads, and other evidence of damage.

(3) *Installation.* Install indicator lights in reverse order of removal procedures.

m. Toggle Switches (S1, S2, S3, S6, S9, S30 and S39).

(1) *Removal.*

(*a*) If wiring harness has not been removed, tag and disconnect electrical leads to toggle switches (82,83,104,107,114,115,116).

(*b*) Remove boots (92 through 98) from switches. Remove hardware (supplied with switches) and remove toggle switches.

(2) *Cleaning and Inspection.*

(*a*) Clean toggle switches with filtered compressed air and an electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect toggle switches for corrosion, cracks, damaged threads and other evidence of damage. Inspect boots for damage or deterioration.

(3) *Installation.* Install toggle switches in reverse order of removal procedures.

n. Magnetic Circuit Breakers (CB11 and CB12).

(1) *Removal.* If wiring harness has not been removed, tag and disconnect electrical leads to circuit breakers (105 and 106).

(2) *Cleaning and Inspection.*

(*a*) Clean circuit breakers with filtered compressed air and an electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect circuit breakers for corrosion, cracks, damaged threads and other evidence of damage.

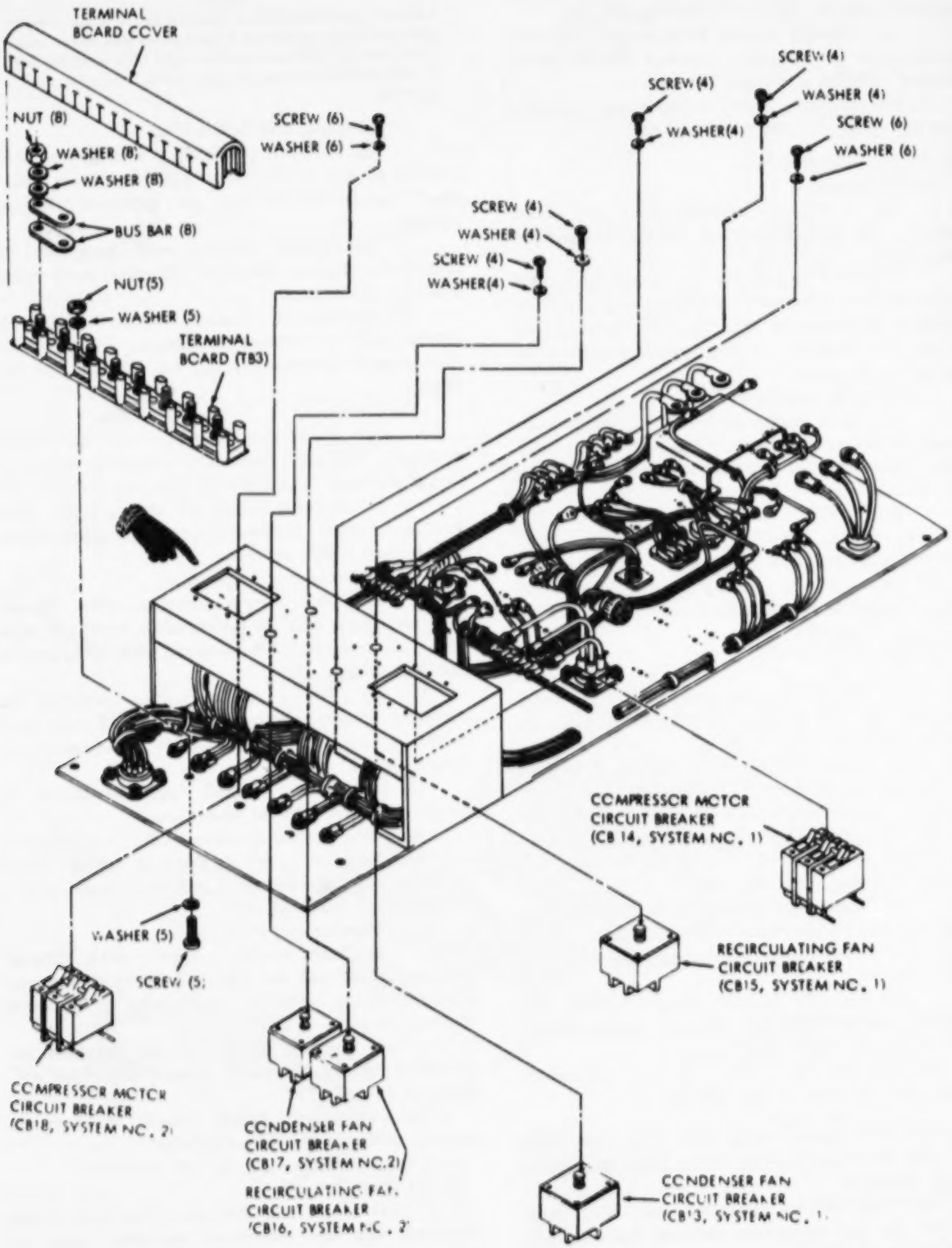
(3) *Installation.* Install circuit breakers in reverse order of removal procedures.

o. Toggle Switches (S5, S7, S8, and S29).

(1) *Removal.*

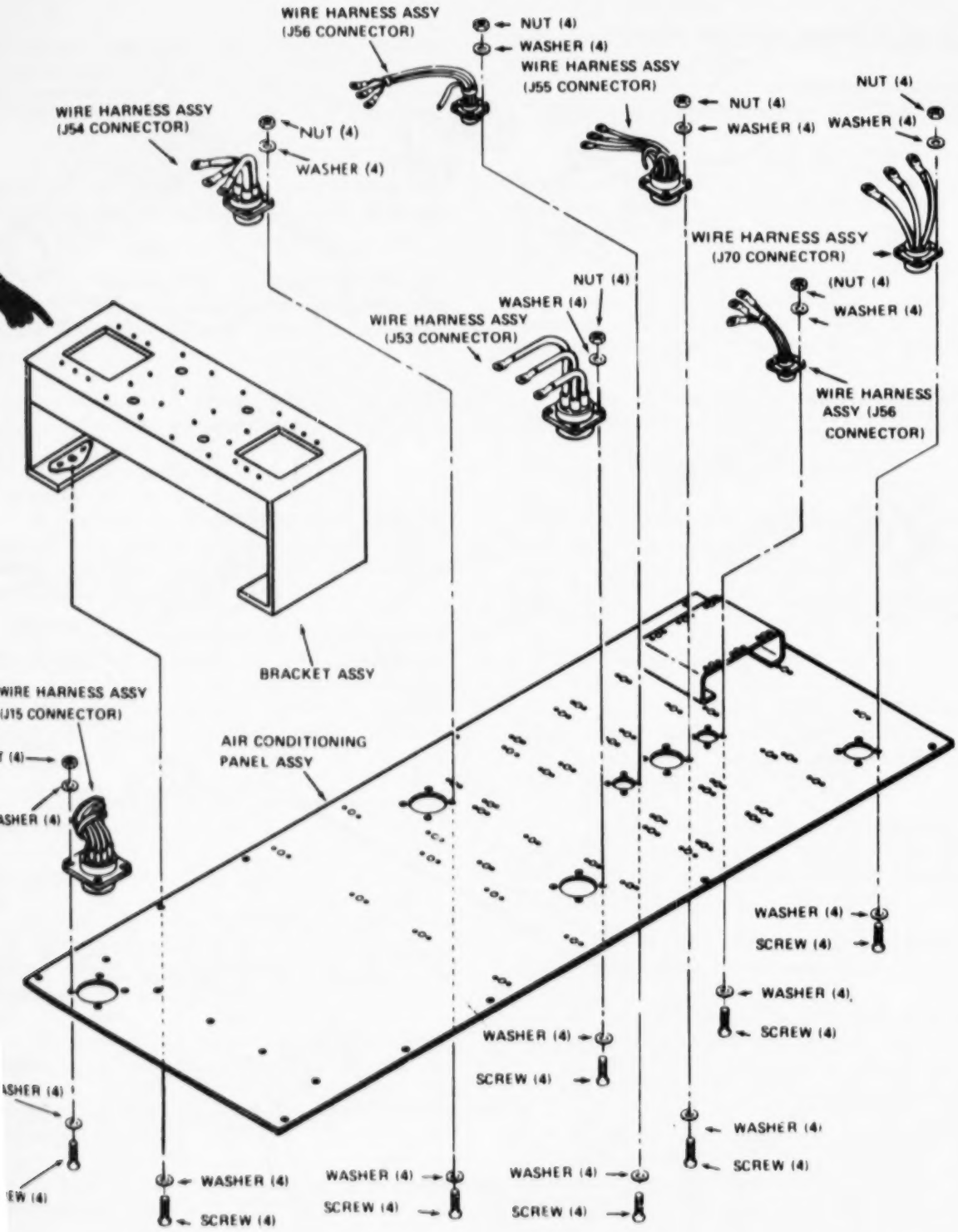
(*a*) If wiring harness has not been removed, tag and disconnect electrical leads to toggle switches (143,144,118 and 117).

(*b*) Remove boots (125,131,137,138) from switches. Remove hardware (supplied with switches)



TS 6115-590-12/4-22 (2)

Figure 4-22. Conditioned Air System Circuit Breaker and Control Panel Component Replacement (Sheet 2 of 3) (TS 6115-590-12/4-22[2]).



TS 6115-590-12/4-22 ③

Figure 4-22. Conditioned Air System Circuit Breaker and Control Panel Component Replacement (Sheet 3 of 3) (TS 6115-590-12/4-22③).

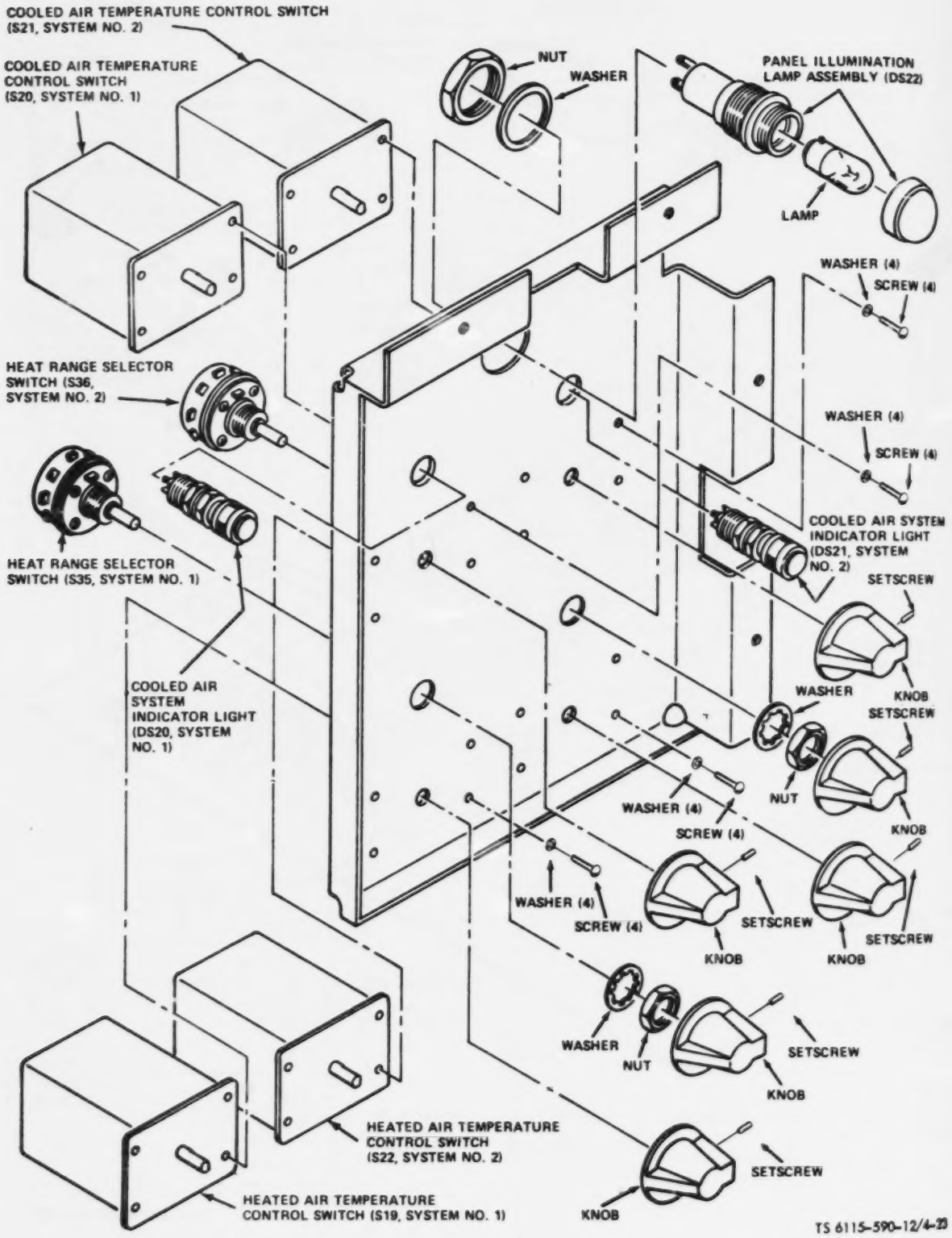


Figure 4-23. Temperature Control Panel Component Replacement (TS 6115-590-12/4-23).

nd remove toggle switches. Remove hardware nd switch guard (132) to remove switch (117).

(2) *Cleaning and Inspection.*

(a) Clean toggle switches with filtered ompressed air and electrician's brush or wipe with clean rag lightly moistened with an approved leaning solvent.

(b) Visually inspect toggle switches for orrosion, cracks, damaged threads and other vidence of damage. Inspect boots for damage or leterioration.

(3) *Installation.* Install toggle switches in everse order of removal procedures.

p. Push Button Switches (S23 and S24).

(1) *Removal.* Tag and disconnect electrical eads to push button switches (126 and 127). Remove attaching nut and washer; then remove witches and seals from panel.

(2) *Cleaning and Inspection.* Clean switches vith filtered compressed air and electrician's rush or wipe with a clean rag lighly moistened vith an approved cleaning solvent. Visually nspect switches for corrosion, cracks, damaged hreads and other evidence of damage.

(3) *Installation.* Install switches by reversing emoval procedures.

q. Circuit Breakers (CB1, CB2, CB9).

(1) *Removal.* Tag and disconnect electrical eads to circuit breakers (141, 145 and 147). Remove screws and washers to remove circuit reakers and boots (142, 146, 148).

(2) *Cleaning and Inspection.* Clean circuit reakers with filtered compressed air and an lectrician's brush. Check circuit breakers for orrosion, cracks, or other damage. Check screws r damaged threads.

(3) *Installation.* Install switches by reversing moval procedures.

Panel Lights (DS13, DS15, DS16).

(1) *Removal.* Tag and disconnect electrical ds to panel lights (119 and 122). Remove aching nut and washer, then remove panel lights from panel. Remove lamps (121 and 124) from socket of panel light.

(2) *Cleaning and Inspection.*

(a) Clean panel lights with filtered compressed air and electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent. Wipe lamp clean using a dry rag.

(b) Visually inspect panel lights for corrosion, cracks, damaged threads and other evidence of damage. Check lamp for any damage.

(3) *Installation.* Install lights by reversing removal procedures.

s. Circuit Breakers (CB5 and CB22).

(1) *Removal.* Tag and disconnect electrical leads to circuit breakers (171 and 172). Remove boots (156 and 157) and attaching nut and washer from circuit breakers, then remove circuit breakers from panel.

(2) *Cleaning and Inspection.*

(a) Clean circuit breakers with filtered compressed air and an electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(b) Visually inspect circuit breakers for cracks, corrosion, damaged threads, and other evidence of damage. Inspect boots for damage or deterioration.

(3) *Installation.* Install circuit breakers in reverse order of removal procedures.

t. Rotary Switches (S14, S15, S16 and S31) and Relays (K42A and K42B).

(1) *Removal.*

(a) Tag and disconnect electrical leads to rotary switches (170, 149, 150 and 165). Loosen set screws to remove knobs (154, 155, 158, 160) and grommets (152, 153, 159, 161). Remove attaching nut and washer to remove switches. Remove items through 169 as an assembly.

(b) Disassemble relays (162, 163) from bracket (164) by removing six nuts (169), twelve flat washers (168) and six screws (166).

(2) *Cleaning and Inspection.* Clean switches and relays with filtered compressed air and electrician's brush or clean with a rag moistened with an approved cleaning solvent. Visually inspect switches and relays for corrosion, cracks, or other damage.

(3) *Installation.* Install rotary switches and relays in reverse order of removal procedures.

u. *Panel.*

(1) *Removal.* Remove items 1 through 150 to remove panel (151).

(2) *Cleaning and Inspection.* Clean panel with an approved cleaning solvent. Inspect panel for cracks, corrosion or other damage.

(3) *Reinstallation.* Reinstall panel by reversing removal procedures.

4-35. Air Conditioning System Panel Assembly

a. *Circuit Breaker Panel (fig. 4-22).*

WARNING

The power plant shall not be operating when maintenance on electrical components is being performed, and the power plant shall not be connected to another power plant that is operating.

NOTE

Access to the conditioned air system circuit breaker panel is obtained by removing two bolts and two washers from each end of the panel and extending panel outward on its electrical harness.

(1) Deleted

(2) *Compressor Motor Circuit Breakers (CB14 and CB18).*

(a) Removal. Tag and disconnect electrical connections to circuit breaker. Remove six screws and six washers from circuit breaker. Remove circuit breaker from panel.

(b) *Cleaning and Inspection.*

1. Clean circuit breaker with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

2. Visually inspect circuit breaker for corrosion, cracks, damaged threads, or other evidence of damage.

(c) *Installation.* Install in reverse order of removal procedures.

(3) *Recirculating Fans Circuit Breakers (CB15 and CB16) and Condenser Fans Circuit Breakers (CB13 and CB17).*

(a) *Removal.* Tag and disconnect electrical connections to circuit breaker. Remove four screws and four washers from circuit breaker. Remove circuit breaker from panel.

(b) *Cleaning and Inspection.*

1. Clean circuit breaker with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

2. Visually inspect circuit breaker for corrosion, cracks, damaged threads or other evidence of damage.

(c) *Installation.* Install in reverse order of removal procedures.

(4) Deleted.

b. Conditioned Air Electrical Control Panel.

WARNING

The power plant shall not be operating when maintenance on electrical components is being performed, and the power plant shall not be connected to another power plant that is operating.

NOTE

Access to the control panel is obtained by removing twenty bolts and twenty washers from the perimeter of the conditioned air electrical control components access panel (fig. 1-1). Disconnect electrical connectors to remove the panel.

(1) *Thermal Relay S32-A, S32-B, S32-C.*

(a) *Removal.* Remove cover from electrical connections on thermal relay. Tag and disconnect electrical connections and bus bars to thermal relay. Remove thermal relay from panel.

(b) *Cleaning and Inspection.*

1. Clean thermal relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

2. Visually inspect thermal relay for corrosion, cracks, damaged threads or other evidence of damage.

(c) *Installation.* Install in reverse order of removal procedures.

(2) *Relay Armature (eight used, K19, K20, K21, K23, K24, K25, K26, K27).*

(a) *Removal.* Remove cover from electrical connections on relay. Tag and disconnect electrical connections to relay. Remove four screws and eight washers from relay. Remove relay from panel.

(b) *Cleaning and Inspection.*

1. Clean relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

2. Installation. Install in reverse order of removal procedure.

(3) *Terminal Board (TB3).*

(a) *Removal.* Remove terminal board cover from terminal board. Tag and disconnect electrical connections and bus bars to terminal board. Remove four nuts and washers attaching terminal board to panel assembly. Remove terminal board from panel assembly.

(b) *Cleaning and Inspection.*

1. Clean terminal board with filtered compressed air and electrician's brush or wipe with a

ean rag moistened with an approved cleaning lvent.

2. Visually inspect terminal board for rrosion, cracks, damaged threads or other evi- nce of damage.

(c) *Installation*. Install the terminal board reverse order of removal procedures.

(4) *Wiring Harness (To Connectors J14, J53, 4, J55, J56, J70, J76).*

(a) *Removal.* Tag and disconnect wires as cessary. Remove four nuts, eight washers, and ur screws to remove each wiring harness.

(b) *Cleaning, Inspection and Repair.*

1. Clean connectors on harnesses using tered compressed air. Wipe wires off using rag oistened with dry cleaning solvent.

2. Visually inspect connectors for acks, corrosion, burns, or other damage. Inspect res for breakage of insulation.

3. Replace harnesses damaged beyond pair.

(c) *Installation.* Install by reversing moval procedures.

(5) *Bracket and Air Conditioning Panel ssemblies (fig. 4-22).*

(a) *Removal.*

1. Prior to removal of either the acket assembly or the air conditioning panel sembly, visually inspect for dents, bends, or other mage. If inspection reveals damage which would cessitate the replacement of either panel or acket, all components which are attached to the rt must be removed. See the applicable para- aphs for removal of each component.

2. Remove bracket assembly from the ir conditioning panel by removing four screws d eight washers.

(b) *Cleaning, Inspection and Repair.*

1. Clean the bracket and panel with dry aning solvent.

2. Inspect the bracket and panel for nts, bending, corrosion, or other damage.

3. Replace parts damaged beyond ple shop repair.

(c) *Installation.* Install by reversing oval procedures.

6. Temperature Control Panel Assembly

laintenance procedures for components mounted he temperature control panel (fig. 4-23) consists leaning, removal, and replacement of damaged ponents.

WARNING

he power plant shall not be operating when aintenance on electrical components is being erformed, and the power plant shall not be con- ected to another power plant that is operating.

NOTE

Access to the temperature control panel is obtained by removing four bolts and four washers from the perimeter of panel. Carefully work panel out far enough to gain access to component parts. If entire panel is to be removed, disconnect electrical connector (P94) and remove panel.

a. *Panel Illumination Lamp Assembly (DS 22).*

(1) *Removal.* Tag and disconnect electrical connections to lamp assembly. Remove nut and washer from lamp assembly. Remove lamp assembly from panel.

(2) *Cleaning and Inspection.*

(a) Clean lamp assembly with filtered compressed air and an electrician's brush or wipe with a clean rag moistened with an approved cleaning solvent.

(b) Visually inspect lamp assembly for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install lamp assembly in reverse order of removal procedure.

b. *Cooled Air System Indicating Lamps (DS20 and DS21).*

(1) *Removal.* Tag and disconnect electrical connections to lamp assembly. Remove nut and washer from lamp assembly. Remove lamp assembly from panel.

(2) *Cleaning and Inspection.*

(a) Clean lamp assembly with filtered compressed air and electrician's brush or wipe with a clean rag moistened with an approved cleaning solvent.

(b) Visually inspect lamp assembly for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedure.

4-37. Auxiliary Power Tray Assembly

Maintenance of the auxiliary power tray assembly (fig. 4-24) consists of cleaning and removal and replacement of damaged or malfunctioning components. The tray assembly is located behind the batteries in the battery compartment. Access to the tray assembly is obtained by opening the battery compartment access door and removing the metal shield covering the tray assembly.

WARNING

Electrical power shall be shut off before performing maintenance on the auxiliary power tray assembly.

a. *Thermal Relay.*

(1) *Removal.*

(a) Tag and disconnect electrical connections to thermal relay (4). Remove bus bars (5) and (6).

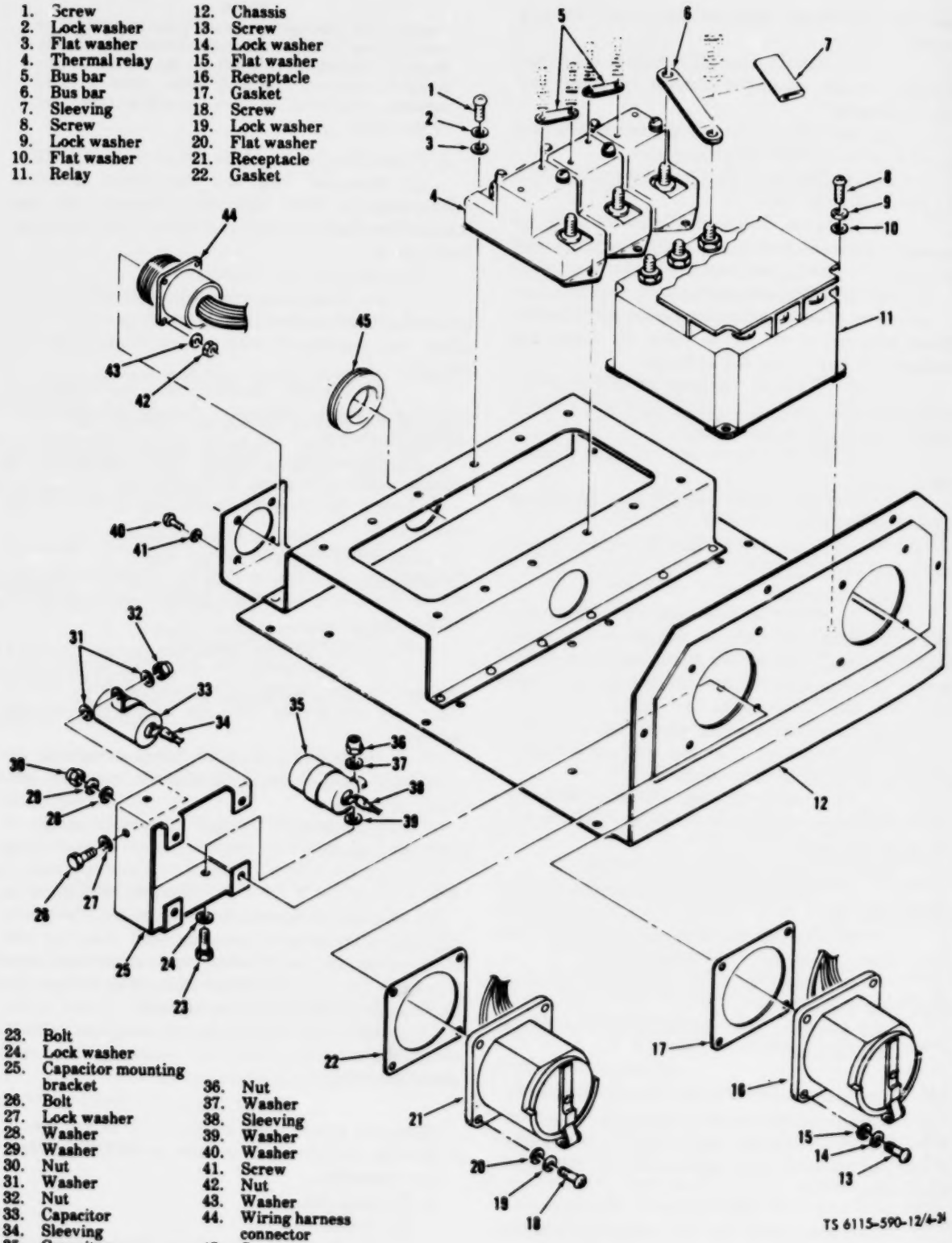
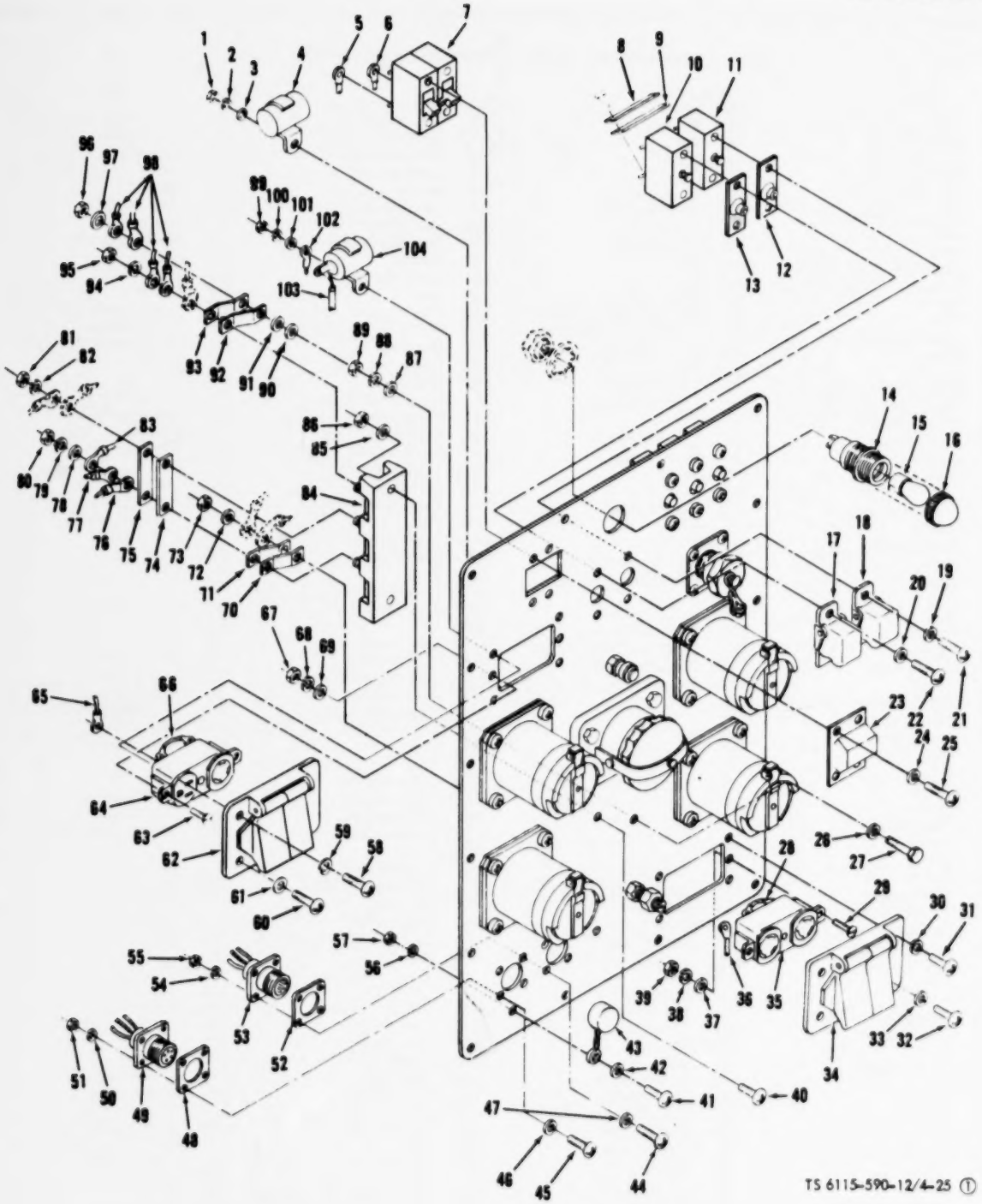


Figure 4-24. Auxiliary Power Tray Component Replacement. (TS 6115-590-12/4-24).

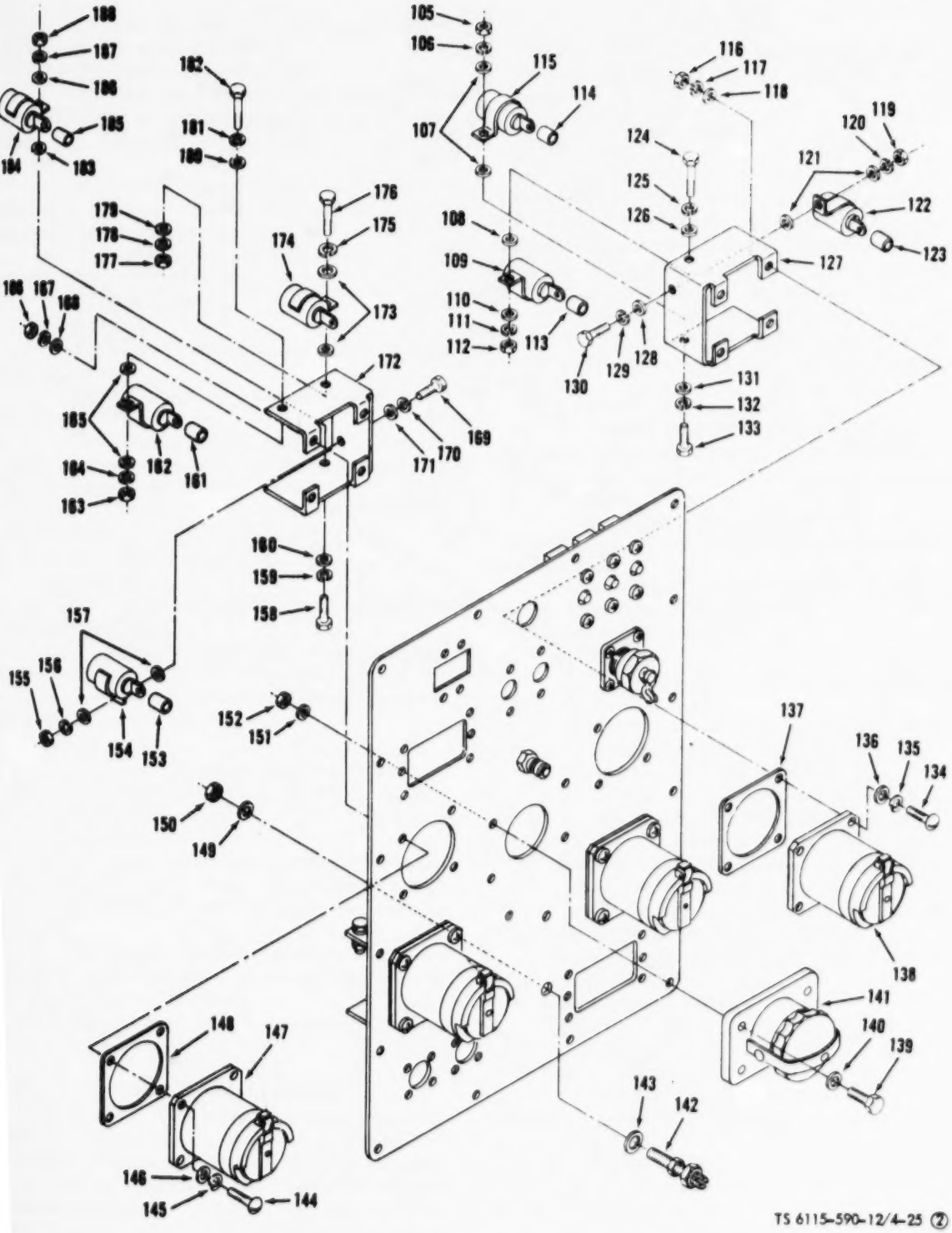


See Page 4-60 for Key to Identification Numbers

Figure 4-25. Receptacle Panel Component Replacement (Sheet 1 of 3) (TS 6115-590-12/4-25[1])

Identification Numbers Figure 4-25 (Sheet 1-2-3)

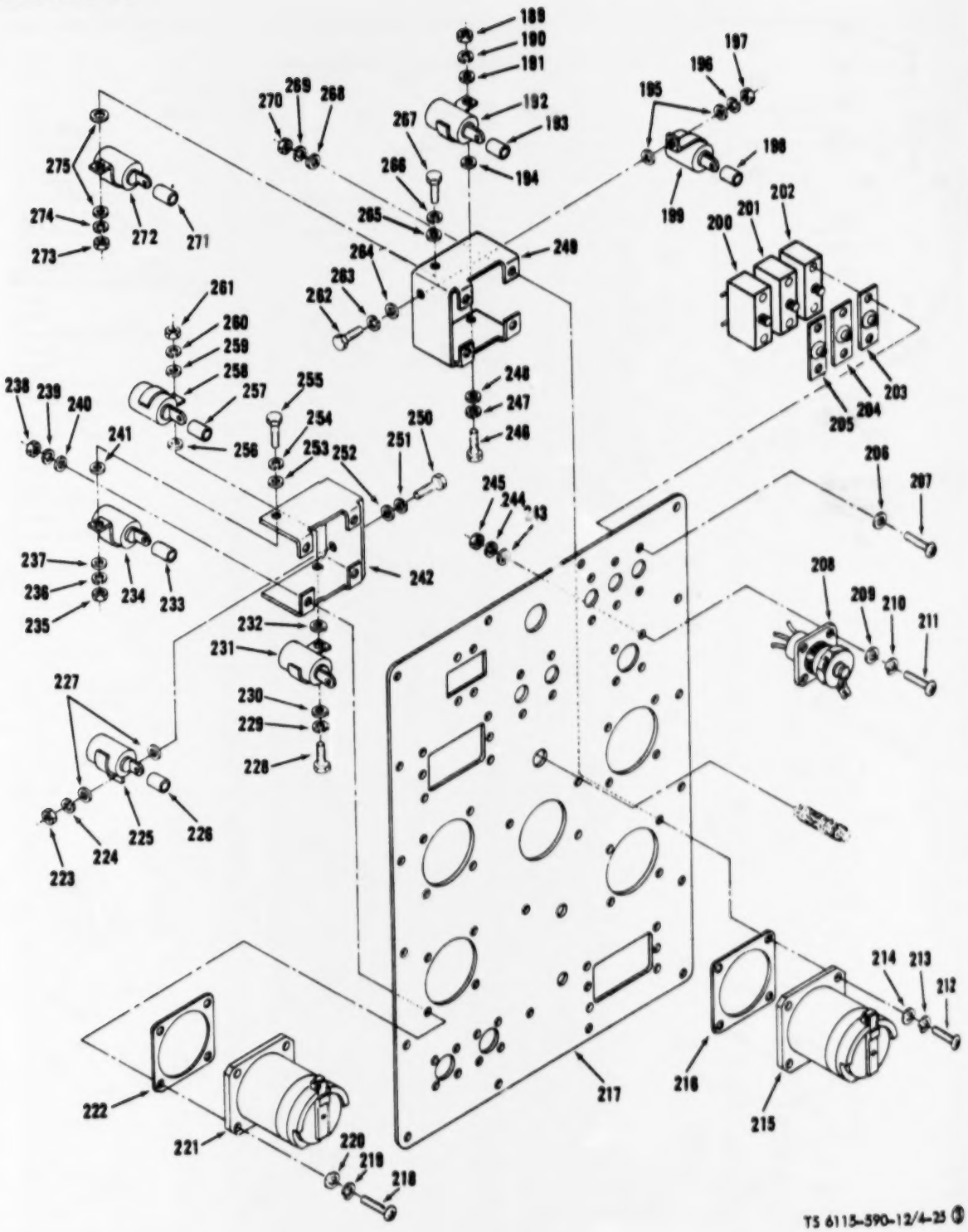
1. Nut
2. Lock washer
3. Flat washer
4. Capacitor (C1)
5. Electrical lead
6. Electrical lead
7. Circuit breaker (CB8)
8. Link
9. Link
10. Circuit breaker (CB3)
11. Circuit breaker (CB20)
12. Boot
13. Boot
14. Panel light (DS17)
15. Lamp
16. Lens
17. Circuit breaker guard
18. Circuit breaker guard
19. Flat washer
20. Flat washer
21. Screw
22. Screw
23. Boot
24. Flat washer
25. Screw
26. Lock washer
27. Bolt
28. Jumper
29. Screw
30. Lock washer
31. Screw
32. Screw
33. Flat washer
34. Cover
35. 400 Hz receptacle (J10)
36. Electrical lead
37. Flat washer
38. Lock washer
39. Nut
40. Screw
41. Screw
42. Flat washer
43. Cover
44. Screw
45. Screw
46. Flat washer
47. Flat washer
48. Gasket
49. Receptacle (J72)
50. Lock washer
51. Nut
52. Gasket
53. Receptacle (J73)
54. Lock washer
55. Nut
56. Lock washer
57. Nut
58. Screw
59. Lock washer
60. Screw
61. Flat washer
62. Cover
63. Screw
64. Receptacle (J9)
65. Electrical lead
66. Jumper
67. Nut
68. Lock washer
69. Flat washer
70. Link
71. Link
72. Washer
73. Nut
74. Link
75. Link
76. Electrical lead
77. Electrical lead
78. Flat washer
79. Lock washer
80. Nut
81. Nut
82. Lock washer
83. Electrical lead
84. Terminal board (TB1)
85. Flat washer
86. Nut
87. Flat washer
88. Lock washer
89. Nut
90. Flat washer
91. Flat washer
92. Link
93. Link
94. Lock washer
95. Nut
96. Nut
97. Flat washer
98. Electrical lead
99. Nut
100. Lock washer
101. Flat washer
102. Electrical lead
103. Electrical lead
104. Capacitor (C18)
105. Nut
106. Lock washer
107. Flat washer
108. Flat washer
109. Capacitor (C4)
110. Flat washer
111. Lock washer
112. Nut
113. Sleeving
114. Sleeving
115. Capacitor (C3)
116. Nut
117. Lock washer
118. Flat washer
119. Nut
120. Lock washer
121. Flat washer
122. Capacitor (C5)
123. Sleeving
124. Bolt
125. Lock washer
126. Flat washer
127. Mounting bracket
128. Flat washer
129. Lock washer
130. Bolt
131. Flat washer
132. Lock washer
133. Bolt
134. Screw
135. Lock washer
136. Flat washer
137. Gasket
138. Receptacle (J7)
139. Bolt
140. Flat washer
141. Receptacle (J2)
142. Terminal stud
143. Lock washer
144. Screw
145. Lock washer
146. Flat washer
147. Receptacle (J5)
148. Gasket
149. Lock washer
150. Nut
151. Flat washer
152. Nut
153. Sleeving
154. Capacitor (C13)
155. Nut
156. Lock washer
157. Flat washer
158. Bolt
159. Lock washer
160. Flat washer
161. Sleeving
162. Capacitor (C11)
163. Nut
164. Lock washer
165. Flat washer
166. Nut
167. Lock washer
168. Flat washer
169. Bolt
170. Lock washer
171. Flat washer
172. Mounting bracket
173. Flat washer
174. Capacitor (C17)
175. Lock washer
176. Bolt
177. Nut
178. Lock washer
179. Flat washer
180. Flat washer
181. Lock washer
182. Bolt
183. Flat washer
184. Capacitor (C12)
185. Sleeving
186. Flat washer
187. Lock washer
188. Nut
189. Nut
190. Lock washer
191. Flat washer
192. Capacitor (C7)
193. Sleeving
194. Flat washer
195. Flat washer
196. Lock washer
197. Nut
198. Sleeving
199. Capacitor (C6)
200. Circuit breaker (CB21)
201. Circuit breaker (CB6)
202. Circuit breaker (CB7)
203. Boot
204. Boot
205. Boot
206. Washer
207. Screw
208. Receptacle (J1)
209. Flat washer
210. Lock washer
211. Screw
212. Screw
213. Lock washer
214. Flat washer
215. Receptacle (J8)
216. Gasket
217. Panel
218. Screw
219. Lock washer
220. Flat washer
221. Receptacle (J6)
222. Gasket
223. Nut
224. Lock washer
225. Capacitor (C14)
226. Sleeving
227. Flat washer
228. Bolt
229. Lock washer
230. Flat washer
231. Capacitor (C2)
232. Flat washer
233. Sleeving
234. Capacitor (C15)
235. Nut
236. Lock washer
237. Flat washer
238. Nut
239. Lock washer
240. Flat washer
241. Flat washer
242. Mounting bracket
243. Flat washer
244. Lock washer
245. Nut
246. Bolt
247. Lock washer
248. Flat washer
249. Mounting bracket
250. Bolt
251. Lock washer
252. Flat washer
253. Flat washer
254. Lock washer
255. Bolt
256. Flat washer
257. Sleeving
258. Capacitor (C16)
259. Flat washer
260. Lock washer
261. Nut
262. Bolt
263. Lock washer
264. Flat washer
265. Flat washer
266. Lock washer
267. Bolt
268. Flat washer
269. Lock washer
270. Nut
271. Sleeving
272. Capacitor
273. Nut
274. Lock washer
275. Flat washer



TS 6115-590-12/4-25 (2)

See Page 4-60 for Key to Identification Numbers

Figure 4-25. Receptacle Panel Component Replacement (Sheet 2 of 3) (TS 6115-590-12/4-25)



See Page 4-60 for Key to Identification Numbers

Figure 4-25. Receptacle Panel Component Replacement (Sheet 3 of 3) (TS 6115-590-12/4-25[3])

(b) Remove screws (1) and washers (2 and 3), and remove thermal relay (4).

(2) *Cleaning and Inspection.*

(a) Clean relay assembly with filtered compressed air and an electrician's brush or wipe with a clean rag moistened with an approved cleaning solvent.

(b) Visually inspect thermal relay for corrosion, cracks or other obvious damage. Replace damaged or malfunctioning relay.

(3) *Installation.* Install thermal relay in reverse order of removal procedures.

b. Relay, Armature (11).

(1) *Removal.*

(a) Tag and disconnect electrical connections to relay.

(b) Remove screws (8) and washer (9,10) and remove relay (11).

(c) Visually inspect relay for corrosion, cracks or other obvious damage. Replace damaged or malfunctioning relay.

(2) *Installation.* Install replacement relay in reverse order of removal.

c. Replacement of Capacitors.

(1) *Removal.*

(a) Tag and disconnect electrical leads to capacitors (33,35).

(b) Remove mounting hardware, then remove capacitors from mounting bracket (25).

(2) *Installation.* Install replacement capacitors in reverse order of removal.

d. Wiring Harness

(1) *Removal.* Tag and disconnect wires as necessary. Remove mounting hardware as required to remove wiring harness.

(2) *Cleaning and Inspection.*

(a) Clean connectors on wiring harness using filtered compressed air. Wipe wires off with a clean rag moistened with an approved cleaning solvent.

(b) Visually inspect connectors for cracks, corrosion, bent or missing pins. Inspect wires for burned or broken insulation.

(3) *Installation.* Install replacement wiring harness in reverse order of removal.

4-38. Receptacle Panel Assembly

Maintenance of the receptacle panel assembly consists of cleaning, removal and replacement of damaged components. Access to the panel assembly is obtained by removing sixteen bolts and washers from the perimeter of the panel. Carefully work the panel assembly out far enough to gain access to the components parts. If entire panel is to be removed, disconnect electrical connectors and remove the panel.

WARNING

Electrical power shall be shut off prior to performing maintenance on the receptacle panel assembly.

a. Terminal Board (TB1).

(1) *Removal.*

(a) Remove nut (73, fig. 4-25) and lock washer (72). Tag electrical lead (76,77,83,95,98). Remove nuts (80,81,95,96), lock washers (79,82,94), and two flat washers (78 and 97). Remove electrical lead, wiring harness, six terminal connecting links (70,71,74,75,90,93) and two flat washers (91,90).

(b) Remove nut (89), lock washer (88), flat washer (87,26) and bolt (27). Remove nuts (86), flat washers (85) and screws (40). Remove terminal board (84).

(2) *Cleaning and Inspection.*

(a) Clean terminal board with filtered compressed air and an electrician's brush, or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(b) Visually inspect terminal board for corrosion, cracks, damaged threads, or other evidence of damage.

(3) *Installation.* Install terminal board in reverse order of removal procedures.

b. Panel Light (DS17).

(1) *Removal.*

(a) Tag and disconnect electrical leads to panel light (14).

(b) Remove nut and washer attaching panel lens from base to remove lamp.

(2) *Cleaning and Inspection.*

(a) Clean panel light with filtered compressed air and an electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent. Wipe lamp clean using a dry cloth.

(b) Visually inspect panel light for corrosion, cracks, damaged threads, and other evidence of damage. Check lamp for damage.

(3) *Installation.* Install panel light in reverse order of removal procedure.

c. Circuit Breaker (CB8).

(1) *Removal.*

(a) Tag and disconnect electrical leads (5 and 6) to circuit breaker (7).

(b) Remove four screws (25) and four flat washers (24). Remove boot (23), then remove circuit breaker.

(2) *Cleaning and Inspection.*

(a) Clean circuit breaker with filtered compressed air and an electrician's brush, or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(b) Visually inspect circuit breaker for cracks, corrosion, damaged threads, and other evi-

dence of damage. Visually inspect boot for damage or deterioration.

(3) *Installation.* Install circuit breaker in reverse order of removal procedures.

d. Circuit Breakers (CB3 and CB20).

(1) *Removal.*

(a) Tag and remove electrical leads to circuit breakers CB3 and CB20 (10,11).

(b) Remove two terminal connecting links (8,9). Remove screws (21,22), flat washers (19,20) and circuit breaker guards (17,18), then remove circuit breakers and boots (12,13).

(2) *Cleaning and Inspection.*

(a) Clean circuit breakers with filtered compressed air and electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(b) Visually inspect circuit breakers for cracks, corrosion, damaged threads, and other evidence of damage. Visually inspect boots for damage or deterioration.

(3) *Installation.* Install circuit breakers in reverse order of removal procedures.

e. 60 Hz Convenience Receptacle (J9) and Capacitor (C18).

(1) *Removal.*

(a) Tag and disconnect electrical lead (103) to capacitor C18 (104). Remove nut (99), two washer (100), flat washer (101), and screws (58). Remove electrical lead (102), dust cover (62) and capacitor C18 (104).

(b) Tag and disconnect electrical lead (65) and jumper (66) from receptacle (64). Remove two nuts (67), two lock washers (68), two flat washers (69) and two screws (63). Remove 60 Hz convenience receptacle (64).

(2) *Cleaning and Inspection.*

(a) Clean 60 Hz convenience receptacle and capacitor C18 with filtered compressed air and an electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(b) Visually inspect receptacle and capacitor for cracks, corrosion, and other evidence of damage.

(3) *Installation.* Install 60 Hz convenience receptacle and capacitor C18 in reverse order of removal procedures.

f. Water Line Heating Receptacles (J72 and J73).

(1) *Removal.*

(a) Remove nut (57), two flat washers (56) and screw (41) from each receptacle cover (43). Unscrew receptacle cover from receptacles (49,53).

(b) Remove self-locking nuts (51,55), lock washers (50,54), flat washers (46,47) and screws (44,45) from each receptacle. Remove receptacles and gaskets (48,52).

(2) *Cleaning and Inspection.*

(a) Clean receptacle with filtered compressed air and an electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(b) Visually inspect each receptacle and receptacle cover for cracks, corrosion, damaged threads, or other evidence of damage.

(3) *Installation.* Install water line heating receptacles in reverse order of removal procedures.

g. 400 Hz Convenience Receptacle (J10) and Capacitor (C1).

(1) *Removal.*

(a) Tag and disconnect electrical leads to capacitor CL (4). Remove self-locking nut (1), lock washer (2), flat washer (3), screws (31) and washer (30). Remove capacitor C1 (4) and dust cover (34).

(b) Tag and disconnect electrical lead (36) and jumper (28) from receptacle (35). Remove self-locking nuts (39), lock washers (38), flat washers (37), and screws (29). Remove 400 Hz convenience receptacle.

(2) *Cleaning and Inspection.*

(a) Clean 400 Hz convenience receptacle and capacitor C1 with filtered compressed air and an electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(b) Visually inspect 400 Hz convenience receptacle and capacitor for cracks, corrosion, and other evidence of damage.

(3) *Installation.* Install 400 Hz convenience receptacle and capacitor C1 in reverse order of removal procedures.

h. Terminal Stud.

(1) *Removal.* Remove nut (150), lock washers (149,143), and terminal stud (142) from panel.

(2) *Cleaning and Inspection.*

(a) Clean terminal stud with filtered compressed air and an electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(b) Visually inspect terminal stud for cracks, corrosion, damaged threads and other evidence of damage.

(3) *Installation.* Install terminal stud in reverse order of removal procedures.

i. 60 Hz Power Output Receptacle (J5) and Capacitors (C11,C12,C13, and C17).

(1) *Removal.*

(a) Slide insulating sleeves (153, 161, 185) down electrical leads to capacitors C17 (174), C11 and C12 (184,162), and C13 (154). Tag and disconnect electrical leads.

(b) Remove self-locking nuts (155, 163, 188), eight lock washers, twelve flat washers, and four bolts. Remove capacitors.

(c) Remove self-locking nuts (166), lock washers (167), flat washers (168) and screws (144). Remove capacitor mounting bracket (172), 60 Hz power outlet receptacle (147), and gasket (148) from panel.

(2) *Cleaning and Inspection.*

(a) Clean capacitor mounting bracket, capacitors, and 60 Hz power outlet receptacle with filtered compressed air and an electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(b) Visually inspect capacitors, capacitor mounting bracket, and 60 Hz power outlet receptacle for cracks, corrosion, and other evidence of damage.

(3) *Installation.* Install capacitors C11,C12, C13 and C17 and 60 Hz power outlet receptacle in reverse order of removal procedures.

j. DC Slave Receptacle (J2).

(1) *Removal.* Remove nuts (152), flat washers (151, 140), and bolts (139). Remove DC slave receptacle (141) from panel.

(2) *Cleaning and Inspection.*

(a) Clean DC slave receptacle with filtered compressed air and an electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(b) Visually inspect DC slave receptacle for cracks, corrosion, damaged threads, and other evidence of damage.

(3) *Installation.* Install DC slave receptacle in reverse order of removal procedures.

k. 400 Hz Power Output Receptacle (J7) and Capacitors (C3, C4 and C5).

(1) *Removal.*

(a) Slide insulating sleeves (113,114,123) down electrical leads to capacitors C3 and C5 (109,115) and Cr (122). Tag and disconnect electrical leads.

(b) Remove nuts (105,112,119), lock washers (106,111,120), flat washers (107,108,110, 121,128), and bolts (124,130,133). Remove capacitors.

(c) Remove nuts (116), lock washers (117,135), flat washers (118,136) and screws (134). Remove capacitor mounting bracket (127), 400 Hz power output receptacle (138) and gasket (137) from panel.

(2) *Cleaning and Inspection.*

(a) *Clean 400 Hz power output receptacle,* capacitors, and capacitor mounting bracket with filtered compressed air and an electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(b) Visually inspect 400 Hz power output receptacle, capacitors, and capacitor mounting bracket for cracks, corrosion, and other evidence of damage.

(3) *Installation.* Install 400 Hz power output receptacle and capacitors C3, C4, C5 in reverse order of removal procedures.

l. 400 Hz Power Output Receptacle and Capacitors (C6, C7 and C10).

(1) *Removal.*

(a) Slide insulating sleeves (271,193,198) down electrical leads to capacitors C7 (272), C6 (192) and C10 (199). Tag and disconnect electrical leads.

(b) Remove nuts (273,189,197), lock washers (274,190,196), flat washers (275,191,194,195,264, 268) and bolts. Remove capacitors.

(c) Remove nuts (270), lock washers (269, 213), flat washers (268,214), and screws (212). Remove capacitor mounting bracket (249), 400 Hz power output receptacle (215), and gasket (216) from panel.

(2) *Cleaning and Inspection.*

(a) Clean capacitors, capacitor mounting bracket, and 400 Hz power output receptacle for cracks, corrosion, and other evidence of damage.

(b) Visually inspect capacitors, capacitor mounting brackets and 400 Hz power output receptacle for cracks, corrosion, and other evidence of damage.

(3) *Installation.* Install 400 Hz power output receptacle and capacitors C6,C7 and C10 in reverse order of removal procedures.

m. 60 Hz Power Output Receptacle (J6) and Capacitors (C2,C14,C15 and C16).

(1) *Removal.*

(a) Slide insulating sleeves (226,233,257) down electrical leads to capacitors C14 (225), C15 and C16 (234,258), and C2 (231). Tag and disconnect electrical leads.

(b) Remove three nuts (223,235,261), eight lock washers (224,236,260), ten flat washers (227,237,241,259) and three bolts (228,250,255). Remove capacitors.

(c) Remove four nuts (238), eight lock washers (219,239), eight flat washers (240,220), and four screws (218). Remove capacitor mounting bracket (242), 60 Hz power output receptacle (221) and gasket (222) from panel.

(2) *Cleaning and Inspection.*

(a) Clean capacitors, capacitor mounting bracket, and 60 Hz power output receptacle with filtered compressed air and an electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(b) Visually inspect capacitors, capacitor mounting bracket, and 60 Hz power output receptacle for cracks, corrosion, and other evidence of damage.

(3) *Installation.* Install 60 Hz power output receptacle and capacitors (C2,C14,C15 and C16) in reverse order of removal procedures.

n. Circuit Breakers (CB6,CB7, and CB21).

(1) *Removal.*

(*a*) Tag and disconnect electrical leads to circuit breakers CB21 (200), CB6 (201), and CB7 (202).

(*b*) Remove six screws (207) and six flat washers (206). Remove circuit breakers (200,201, 202) and boots (203,204,205) from panel.

(2) *Cleaning and Inspection.*

(*a*) Clean circuit breakers with filtered compressed air and an electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect circuit breakers for cracks, corrosion, damaged threads and other evidence of damage. Visually inspect boots for damage or deterioration.

(3) *Installation.* Install circuit breakers in reverse order of removal procedures.

o. DC Standby Receptacle (J1).

(1) *Removal.* Remove four nuts (245), eight lock washers (244,210), eight flat washers (243,209) and four screws (211), then remove DC standby receptacle (208) from panel (217).

(2) *Cleaning and Inspection.*

(*a*) Clean DC standby receptacle wit. filtered compressed air and an electrician's brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect DC standby receptacle for cracks, corrosion, damaged threads or other evidence of damage.

(3) *Installation.* Install DC standby receptacle in reverse order of removal procedures.

Section X. Maintenance of Water System Plumbing Installation

4-39. General

The water system consists of a hot water storage tank, surge tank, cold water pump, hot water pump, heat exchanger, manual valves, and various pressure and temperature switches to control water pressure and temperature. Relief valves provide over-pressure protection for the system.

4-40. Tube Assemblies and Plumbing Fittings

NOTE

Drain water system prior to disconnecting any tube assemblies. See paragraph 4-4a (3).

a. Removal. Remove tube assemblies (fig. 4-26) and plumbing fittings only as required for access to other components or to replace a damaged component.

NOTE

Tag or otherwise identify connection points, routing, orientation of fittings and location of supporting clamps for aid at reassembly.

b. Cleaning and Inspection.

(1) Clean tube assemblies and plumbing fittings with an approved cleaning solution compatible with potable water and dry thoroughly with filtered compressed air.

(2) Visually inspect for cracks, corrosion, damaged threads and other obvious damage. Replace all damaged parts.

c. Installation. Install tube assemblies and plumbing fittings in reverse order of removal using new packings and gaskets as applicable.

4-41. Water System Components

a. Removal. Remove water system components (tanks, pumps, heat exchanger, valves and switches) as required for replacement by disconnecting plumbing while following the sequence of index numbers (1 through 113) to figure 4-26. Refer to figure 4-27 to disconnect electrical lead to water system components.

NOTE

In order to reach the fastenings securing the hot water storage tank, a section of the bulk head between the battery compartment and the compartment containing the water tanks must be removed.

b. Installation. Install water system components in reverse order of removal procedures using figure 4-26 as a guide. Refer to figure 4-27 to connect electrical leads to water system components.

NOTE

Prime the water system as described in paragraph 4-2b (5) after completion of component replacement.

Section XI. Maintenance of Bleed Air, Exhaust and Heating Installation

4-42. General

The heated air system uses two independent control and mixing systems connected to a single source of heated air. Each system uses hot compressed air from the gas turbine engine through the bleed load control valve. Each system is capable of being operated independently to provide one half of the total heat requirement, or together to provide all the total heat requirement. Each heated air system consists of a common air pressure regulator.

a common load control thermostat, a flow control valve, an air mixing chamber, two recirculating fans and connecting ducting, tubing and fittings.

4-43. Bleed Load Control Valve

a. Removal.

(1) Remove tube assemblies (fig. 4-28), and wiring harness connector from load control valve.

(2) Remove clamp holding duct assembly to valve.

(3) Remove clamp securing load control valve to turbine plenum and remove load control valve from power unit.

b. Installation.

(1) Install replacement load control valve in reverse order of removal procedures using new gaskets and new clamps if required.

(2) Connect tube assemblies and wiring harness connector to load control valve.

4-44. Air Pressure Regulator

NOTE

To gain access to the air pressure regulator, the following interferences must be removed: inlet air duct, oil cooler and ducting and upper plenum.

a. Removal. Remove tube assemblies (fig. 4-28), two attaching bolts, four washers, two nuts, and two attaching clamps. Remove air pressure regulator from engine.

b. Installation. Install replacement air pressure regulator on gas turbine engine in reverse order of removal procedures using new clamps as required. Reconnect tube assemblies using new packing.

c. Adjustment. After replacement of regulator, check regulator output pressure as follows.

(1) Disconnect outlet air pressure line from air pressure regulator and connect a line between the air pressure regulator outlet port and the AIR IN connection (fig. 4-14) on gas turbine engine and analyzer.

(2) Start and accelerate engine to no load governed speed. Read air pressure regulator outlet pressure on AIR gauge on analyzer panel.

(3) Air pressure regulator outlet pressure shall be 19.0 to 20.0 psig.

(4) If pressure is not as specified, shut down engine. Loosen locknut on end of air pressure regulator and turn adjustment screw clockwise to increase outlet pressure. Tighten locknut.

(5) Repeat check procedure until satisfactory adjustment is made. Disconnect and remove gas turbine engine analyzer.

4-45. Air Pressure Regulator Filter Element

NOTE

To gain access to the air pressure regulator, the following interferences must be removed: inlet air duct, oil cooler and ducting, and upper plenum.

a. Removal.

(1) Without removing regulator from the engine, remove tube assembly from filter element cover on lower end of regulator (fig. 4-28).

(2) Remove the clamp from the cover and unscrew filter cover from regulator body, then remove filter element, gasket and packing.

b. Cleaning and Inspection.

(1) If filter element is of spun wire design (coarse threads at base), clean using ultrasonic method or by washing with an approved cleaning solvent and dry thoroughly with filtered compressed air.

(2) If filter element is of wire mesh design (no threads), clean using a paint stripping solution.

(3) Inspect filter element for any obvious damage.

c. Installation.

(1) Coat threads of regulator housing with compound.

(2) Install satisfactory or replacement filter element in reverse order of removal procedures using new packing and gasket.

(3) Reconnect tube assembly to filter cover.

d. Adjustment. After replacement of filter element, check regulator output pressure and adjust if required in accordance with paragraph 4-44c.

4-46. Load Control Thermostat

a. Removal.

(1) Hold flats on thermostat valve assembly with a wrench and remove tube assembly (fig. 4-28).

(2) Remove one attaching bolt and washer; remove plate and shim washers, then remove load control thermostat from turbine plenum flange.

b. Installation.

(1) Coat threads of attaching bolt with a thin coat of compound (Fel-Pro C-5).

(2) Install replacement thermostat in turbine plenum flange with side stamped "AFT" facing rearward or downstream.

(3) Install shim washers to obtain 0.010 to 0.020 inch pinch between plate and mounting boss, then install retainer plate.

(4) Secure with attaching washer and bolt. Tighten bolt to 50 to 70 inch-pounds torque.

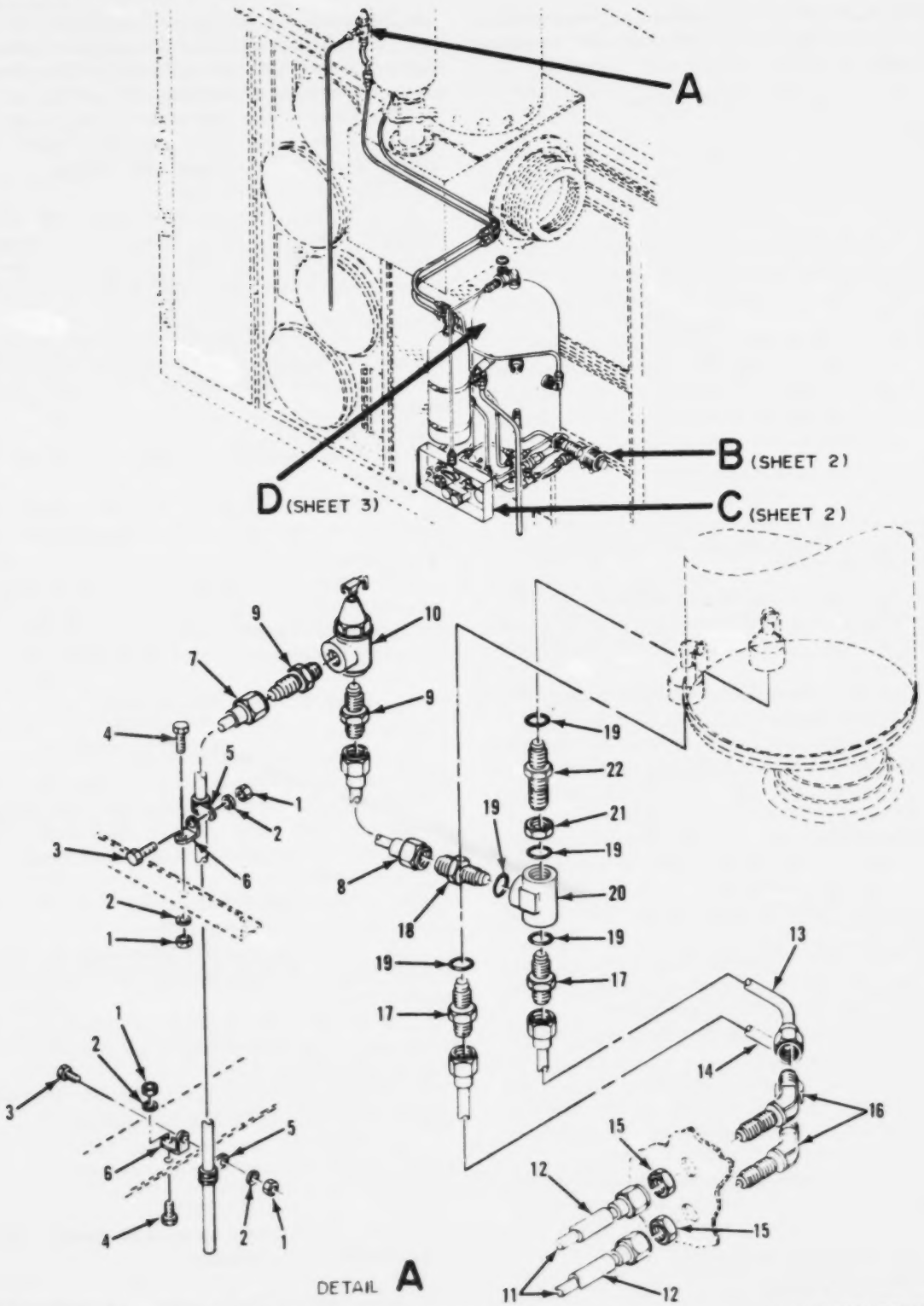
(5) Hold flats on thermostat valve assembly with a wrench and connect tube assembly.

CAUTION

Do not exceed 150 inch-pounds torque when tightening tube assembly.

c. Adjustment. Check controlling temperature and adjust if required as follows.

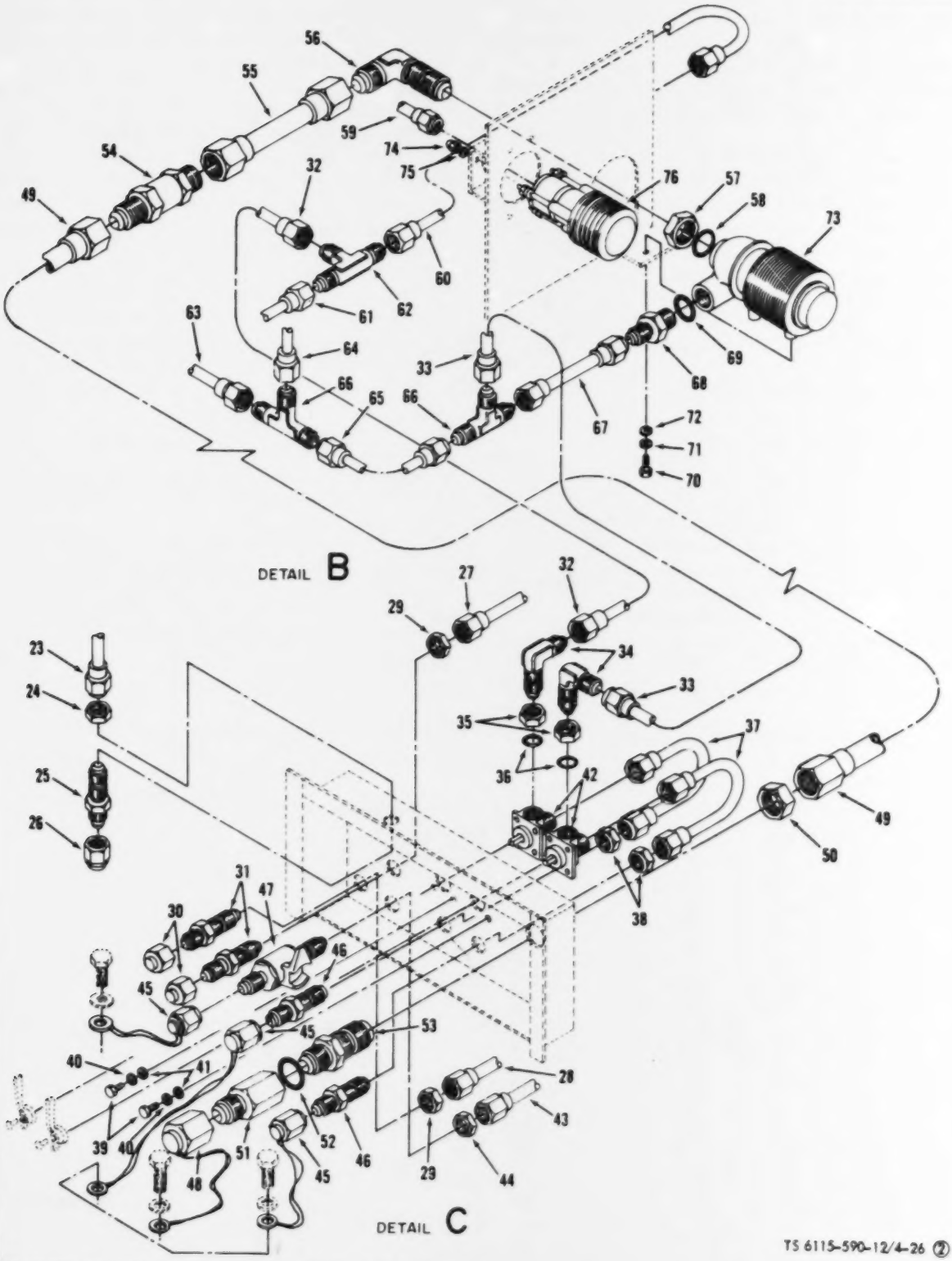
(1) Connect gas turbine engine analyzer to power unit as described in paragraph 4-14b.



SEE PAGE 4-71 FOR KEY TO IDENTIFICATION NUMBERS

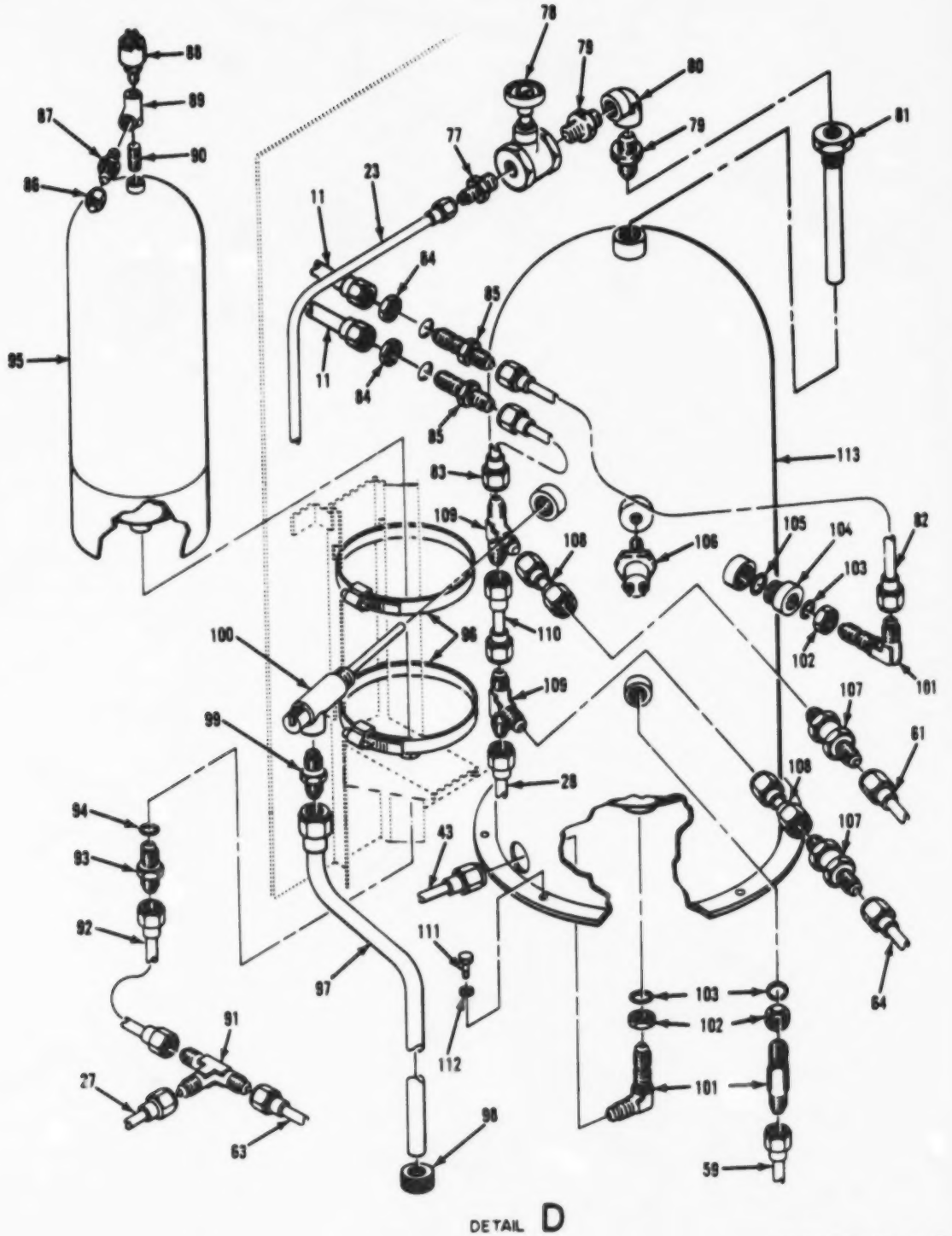
TS 6115-590-12/4-26 ①

Figure 4-26. Water System Component Replacement (Sheet 1 of 3) (TS 6115-590-12/4-26[1]).



SEE PAGE 4-71 FOR KEY TO IDENTIFICATION NUMBERS

Figure 4-26. Water System Component Replacement (Sheet 2 of 3) (TS 6115-590-12/4-26(2)).



SEE PAGE 4-71 FOR KEY TO IDENTIFICATION NUMBERS

Figure 4-26. Water System Component Replacement (Sheet 3 of 3) (TS 6115-590-12/4-26[3]).

(2) Start engine and accelerate to no load governed speed. Operate at this speed for approximately two minutes to stabilize operation.

(3) Operate both heated air systems at full heat as described in figure 2-16.

(4) With heated air systems operating at full heat, place the mode select switch to COOL on both systems. The heated air flow control valves will remain open but the engine load control valve will close. Open the engine load control valve by installing a jumper between analyzer jacks identified LOAD VALVE and DC POWER. This condition bypasses the overtemperature thermoswitches in the air out compartment and delivers both cooled and heated air at the same time to provide sufficient engine load to raise the exhaust gas temperature to 1075°F (552°C to 579°C), shut down power unit and thermostat setting.

CAUTION

Monitor the air out temperature and shut down the power plant if air discharge temperature exceeds 200°F (93°C).

(5) Observe engine exhaust gas temperature on analyzer. The load control thermostat should modulate the load control valve to control exhaust gas temperature at 1025°F to 1075°F (552°C to 579°C). If control temperature is not 1025°F to 1075°F (552°C to 579°C), shut down power unit and adjust thermostat as follows.

(6) Remove thermostat by holding flats on thermostat valve with a wrench and remove tube assembly.

(7) Remove one attaching bolt and washer, retainer plate and shim washers. Remove thermostat from turbine plenum flange. Remove thermostat valve from body.

(8) Measure total thickness of shims with micrometer. To decrease temperature setting, increase shim stack thickness. To increase temperature setting, decrease shim stack thickness. A change of 0.001 inch in shim stack thickness will change cracking temperature by approximately 30°F. Add or remove shims as required. Install corrected thickness of shims and fitting.

(9) Reinstall thermostat in reverse order of removal.

(10) Recheck controlling temperature at least twice.

(11) When controlling temperature is satisfactory, shut down power plant and disconnect and remove analyzer.

4-47. Flow Control Valve

a. Removal. Remove wiring harness connector from flow control valve (fig. 4-29). Loosen clamps on each side of valve, remove clamps from flange and remove valve and gasket.

b. Installation. Install valve in place using new gaskets in reverse order of removal procedures. Reconnect wiring harness connector.

1. Nut
2. Flat washer
3. Bolt
4. Bolt
5. Loop clamp
6. Bracket
7. Tube assembly
8. Tube assembly
9. Nipple
10. Pressure relief valve
11. Tube assembly
12. Sleeving
13. Tube assembly
14. Tube assembly
15. Nut
16. Elbow
17. Reducer
18. Union
19. O-ring
20. Tee
21. Nut
22. Union
23. Tube assembly
24. Nut
25. Union
26. Nut
27. Tube assembly
28. Tube assembly
29. Nut
30. Pressure cap assy.
31. Union
32. Tube assembly
33. Tube assembly
34. Elbow
35. Nut
36. O-ring
37. Tube assembly
38. Nut
39. Bolt
40. Flat washer
41. Lock washer
42. Plug valve
43. Tube assembly
44. Nut
45. Cap assembly
46. Union
47. Ball valve
48. Cap assembly
49. Tube assembly
50. Nut
51. Bushing
52. Packing
53. Union
54. Check valve
55. Tube assembly
56. Elbow
57. Nut
58. O-ring
59. Tube assembly
60. Tube assembly
61. Tube assembly
62. Tee
63. Tube assembly
64. Tube assembly
65. Tube assembly
66. Tee
67. Tube assembly
68. Reducer
69. O-ring
70. Bolt
71. Flat washer
72. Lock washer
73. Cold water pump
74. Nut
75. Flat washer
76. Hot water pump
77. Nipple
78. Gate valve
79. Nipple
80. Elbow
81. Stand pipe
82. Tube assembly
83. Tube assembly
84. Nut
85. Union
86. Pressure cap assy.
87. Nipple
88. Pressure switch
89. Tee
90. Nipple
91. Tee
92. Tube assembly
93. Union
94. O-ring
95. Surge tank
96. Hose clamp
97. Tube assembly
98. Grommet
99. Nipple
100. Relief valve
101. Elbow
102. Nut
103. O-ring
104. Bushing
105. O-ring
106. Thermostatic switch
107. Check valve
108. Tube assembly
109. Tee
110. Tube assembly
111. Bolt
112. Flat washer
113. Hot water tank

IDENTIFICATION KEY TO FIGURE 4-26 (PAGE 468, 469, 470)

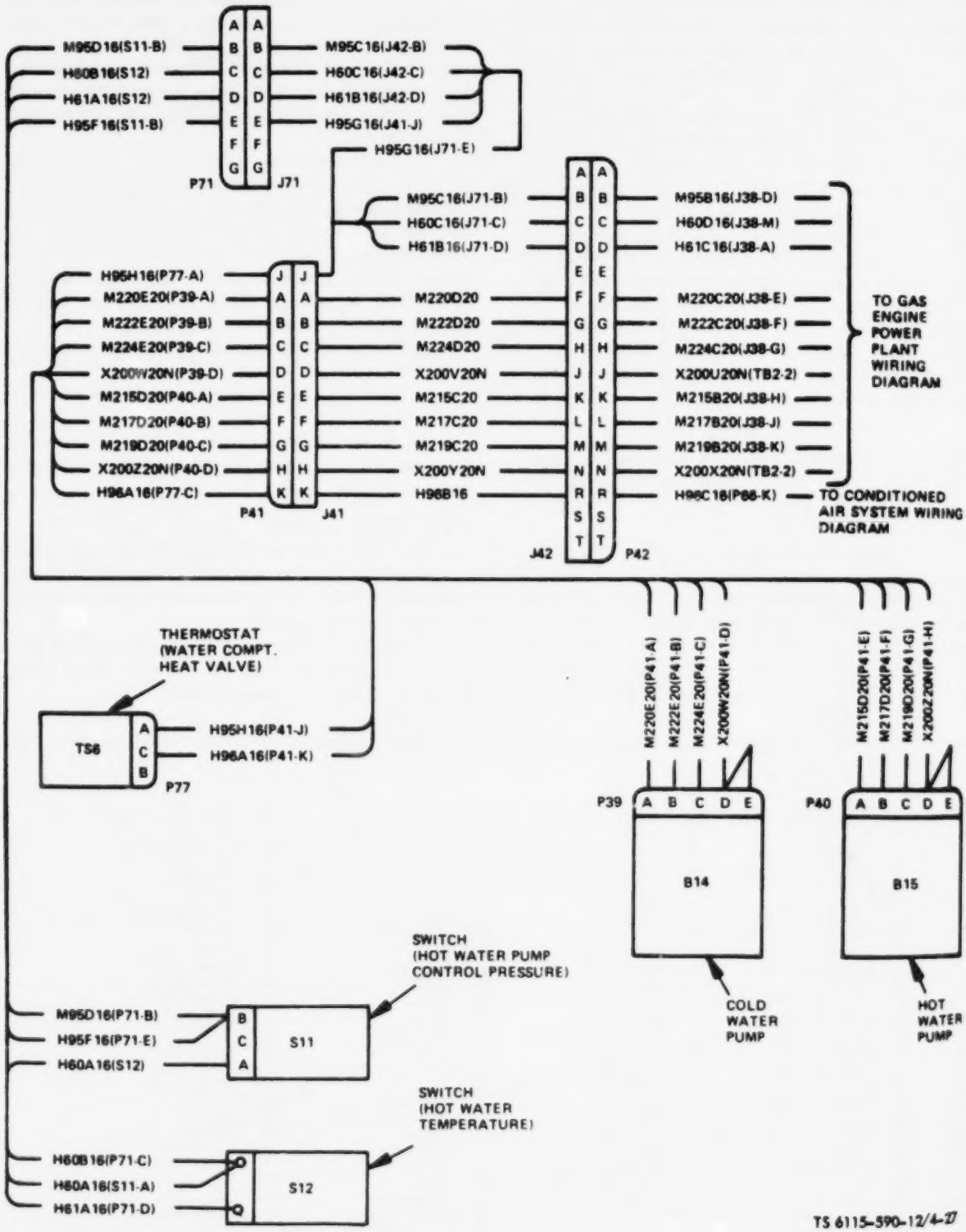


Figure 4-27 Water System Wiring Diagram (TS 6115-590-12/4-27).

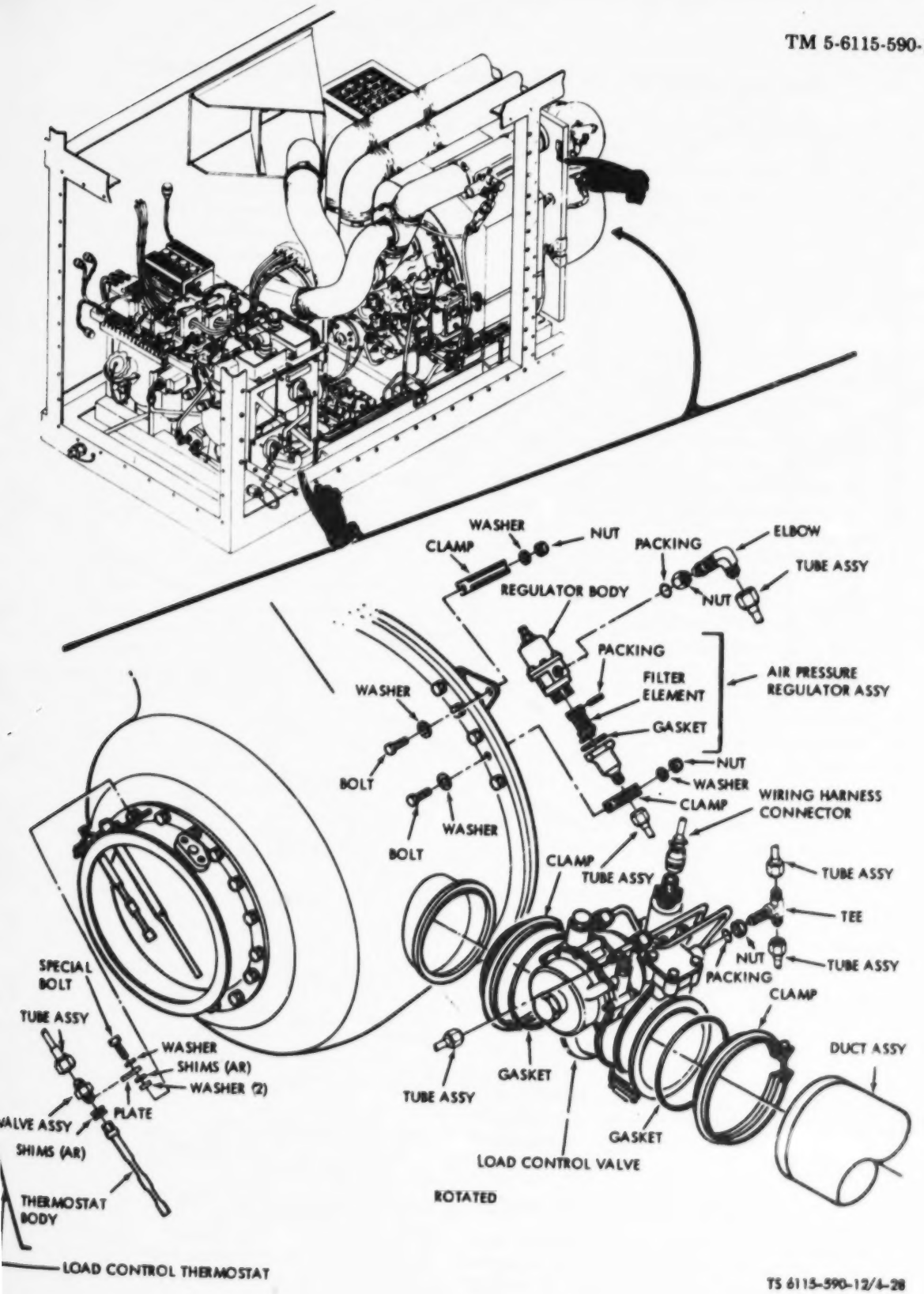


Figure 4-28. Heated Air System Component Replacement (TS 6115-590-12/4-28).

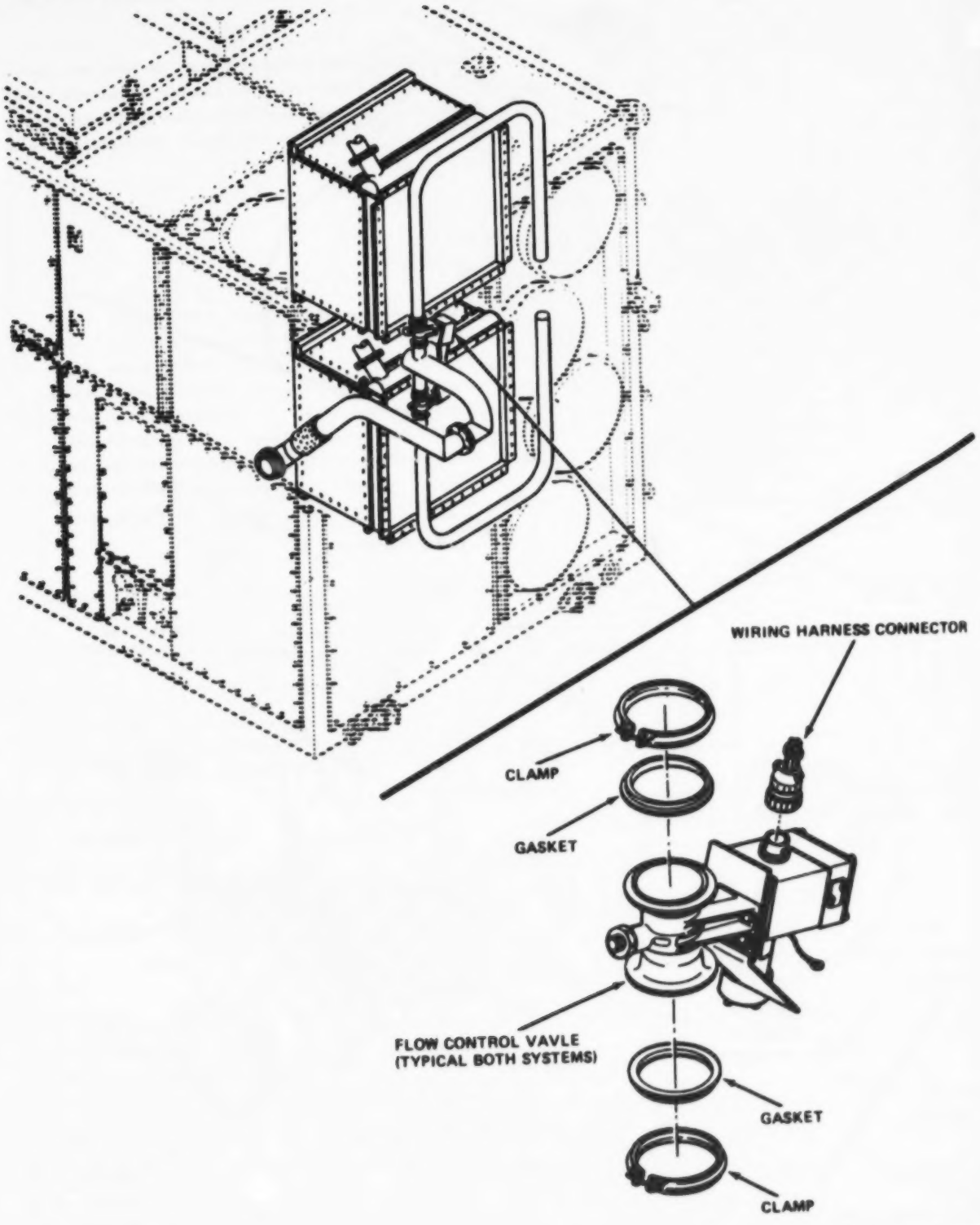


Figure 4-29. Flow Control Valves Replacement (TS 6115-590-12/4-29).

Section XII. Maintenance of Compressed Air and Vacuum System

4-48. General

The compressed air and vacuum system provides compressed air and vacuum for external applications and compressed air for scavening the engine air inlet filter and for heating the water storage compartment. These systems consist of control valves, tube and hose assemblies, vacuum ejector and exhaust ducts.

4-49. Tube Assemblies and Plumbing Fittings

a. Compressed Air System.

(1) *General.* The hose and tube assemblies and plumbing fittings provide interconnection of the compressed air system.

(2) *Removal.* Remove hose and tube assemblies and plumbing fittings as required for replacement following the sequence of index numbers on fig. 4-30.

(3) *Cleaning, Inspection and Repair.*

(*a*) Clean hose and tube assemblies and plumbing fittings with an approved cleaning solvent and dry thoroughly with filtered compressed air.

(*b*) Inspect all threaded parts for stripped, crossed or peened threads. If threads are damaged beyond repair, replace the damaged part.

(*c*) Inspect hose assemblies for cracks, breaks, chafing and damage to hose interior. If damaged, replace hose assembly.

(*d*) Inspect tube assemblies for kinks, bends, cracks, or other damage which might restrict flow or result in leakage. Inspect nuts and sleeves on tube assemblies for loose sleeves or damage to nuts. If damaged, replace tube assemblies.

(*e*) Inspect plumbing fittings for cracks or clogged passages. Clean clogged passages and replace cracked fittings.

(*f*) Replace all gaskets and packings if removed regardless of condition.

(4) *Installation.* Install hose and tube assemblies and plumbing fittings in reverse order of removal procedures and sequence of index numbers assigned to figure 4-30.

b. Vacuum System.

(1) *General.* The hose and tube assemblies and plumbing fittings provide interconnection of vacuum system components.

(2) *Removal.* Remove hose and tube assemblies and plumbing fittings as required in the sequence of index numbers assigned to figure 4-31.

(3) *Cleaning, Inspection and Repair.*

(*a*) Clean hose and tube assemblies and plumbing fittings using an approved cleaning solvent and dry thoroughly with filtered compressed air.

(*b*) Inspect all threaded parts for stripped, crossed or peened threads. If threads are damaged beyond repair, replace the damaged part.

(*c*) Inspect hose assemblies for cracks, breaks, chafing and damage to hose interior. If damaged, replace hose assembly.

(*d*) Inspect tube assemblies for kinks, bends, cracks or other damage which might restrict flow or result in leakage. Inspect nuts and sleeves on tube assemblies for loose sleeves or damaged nuts. If damaged, replace tube assemblies.

(*e*) Inspect plumbing fittings for cracks or clogged passages. Clean clogged passages and replace cracked or damaged fittings.

(*f*) Replace all gaskets and packings if removed regardless of condition.

(4) *Installation.* Install hose and tube assemblies and plumbing fittings in reverse order of removal procedures and sequence of index numbers assigned to figure 4-31.

4-50. Compressed Air and Vacuum System Components

a. Removal. Disconnect plumbing connections to each component as required. Remove attaching hardware and remove component to be replaced following the sequence of index numbers assigned to figure 4-30 and 4-31.

b. Cleaning, Inspection and Repair

(1) Clean components with an approved cleaning solvent and dry thoroughly with filtered compressed air.

(2) Inspect threaded areas for crossed, stripped, or peened threads. If threads are damaged beyond repair, replace components in reverse order of removal.

Section XIII. Maintenance of Engine and Skid Assembly

4-51. General

The engine and skid assembly contains the gas turbine engine, the upper and lower electrical power chassis, oil and fuel tanks, fuel boost pump, fuel filter and fuel float tank. Access to the engine and skid assembly for replacement of components is obtained by removing the access panels as shown in figure 4-32. Before removing the access panel to the fuel and oil components, the electrical connectors to the main instrument panel must be disconnected.

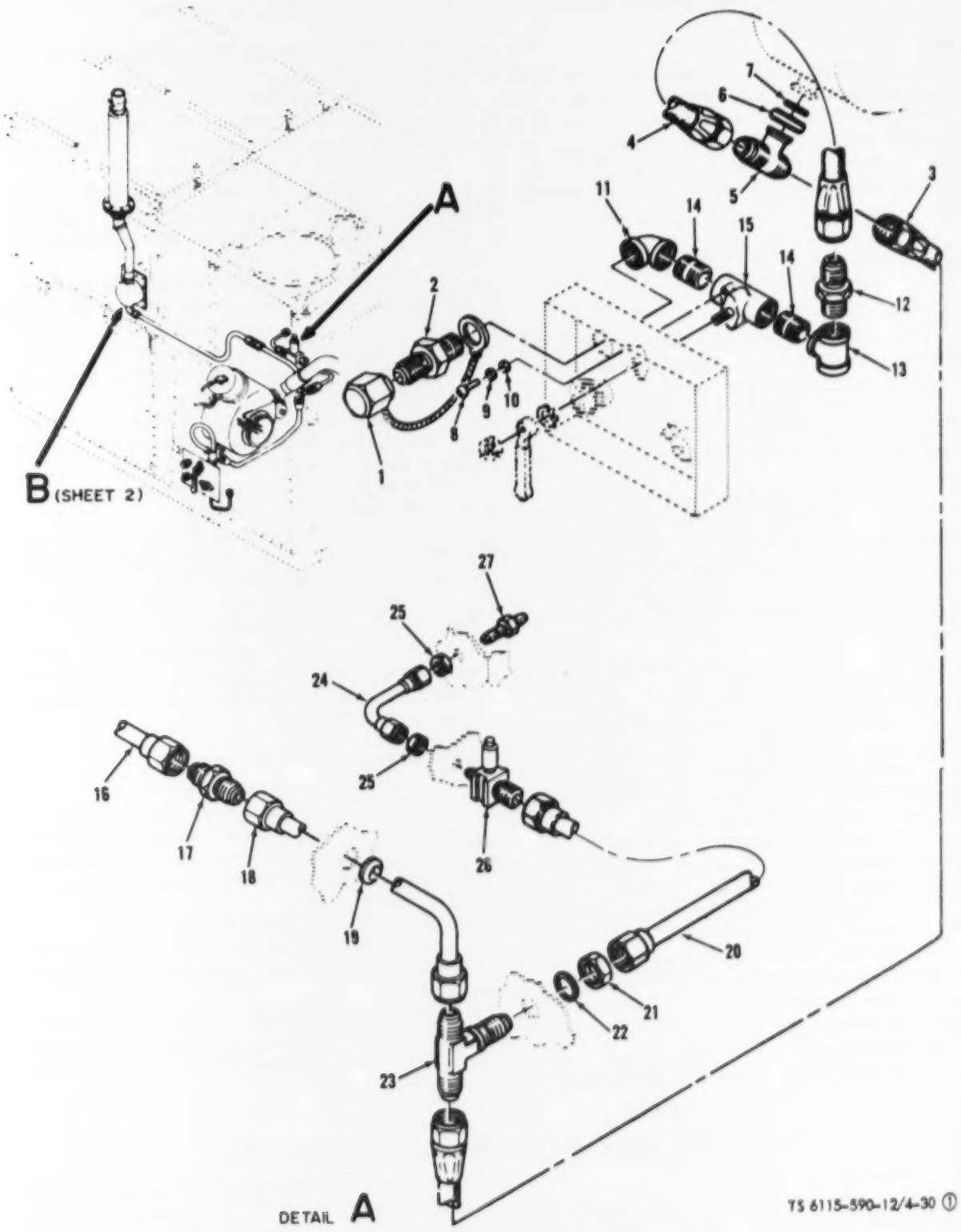
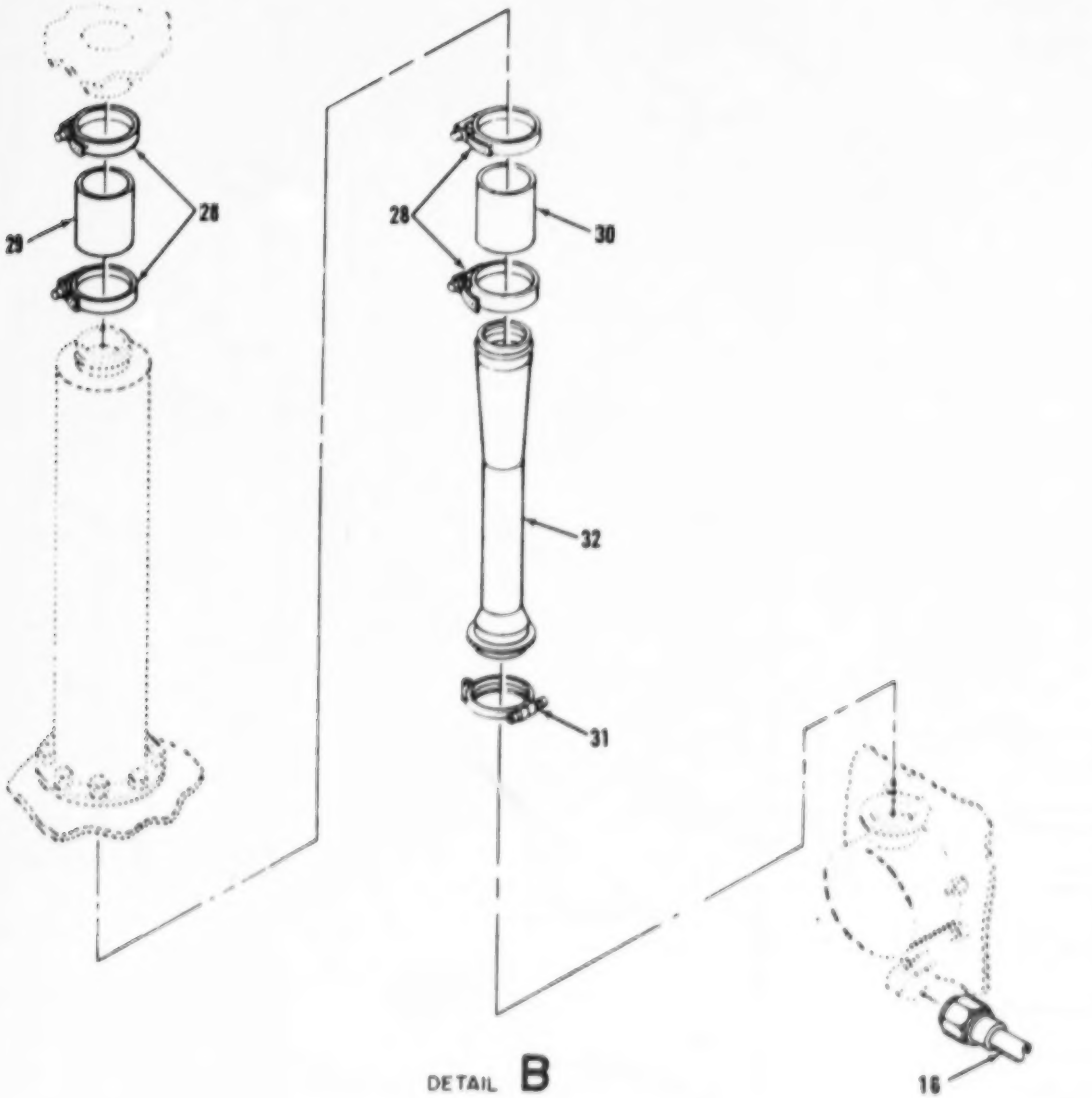


Figure 4-30. Compressed Air System Component Replacement (Sheet 1 of 2) (TS 6115-590-12/4-30①).

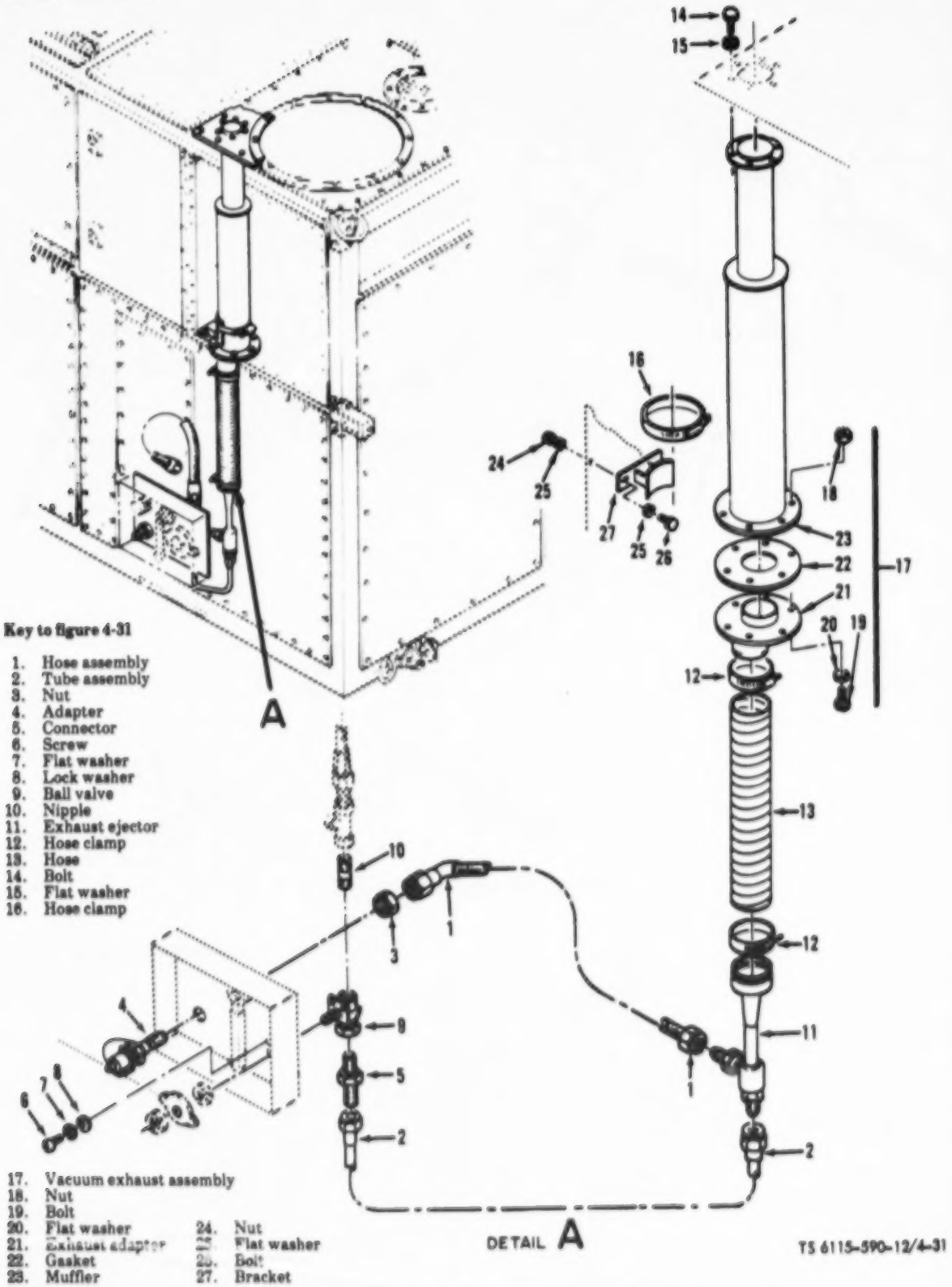


TS 6115-590-12/4-30 (2)

Key to figure 4-30

1. Cap	9. Flat washer	17. Union	25. Nut
2. Union	10. Lock washer	18. Tube assembly	26. Solenoid valve
3. Hose assembly	11. Elbow	19. Grommet	27. Union
4. Hose assembly	12. Nipple	20. Tube assembly	28. Hose clamp
5. Tee	13. Tee	21. Nut	29. Hose
6. Clamp	14. Nipple	22. Flat washer	30. Hose
7. Gasket	15. Ball valve	23. Tee	31. Clamp
8. Screw	16. Tube assembly	24. Tube assembly	32. Venturi tube

Figure 4-30. Compressed Air System Component Replacement (Sheet 2 of 2) (TS 6115-590-12/4-30(2))



Key to figure 4-31

1. Hose assembly
2. Tube assembly
3. Nut
4. Adapter
5. Connector
6. Screw
7. Flat washer
8. Lock washer
9. Ball valve
10. Nipple
11. Exhaust ejector
12. Hose clamp
13. Hose
14. Bolt
15. Flat washer
16. Hose clamp
17. Vacuum exhaust assembly
18. Nut
19. Bolt
20. Flat washer
21. Exhaust adapter
22. Gasket
23. Muffler
24. Nut
25. Flat washer
26. Bolt
27. Bracket

Figure 4-31. Vacuum System Component Replacement (TS 6115-590-12/4-31).

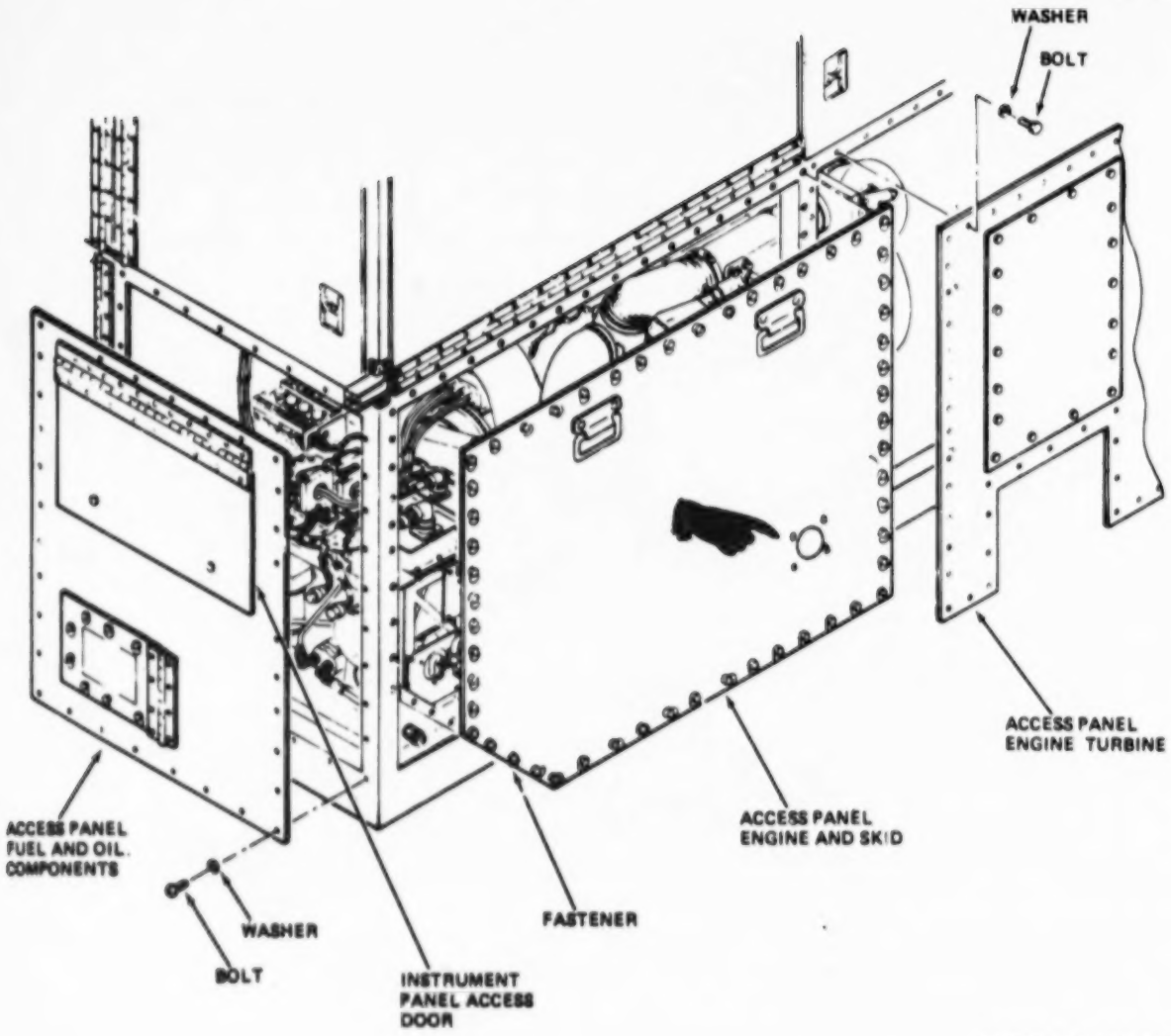


Figure 4-32. Engine and Skid Access Panel Removal (TS 6115-590-12/4-32).

Some components of the engine and skid assembly (bleed load control valve, air pressure regulator and load control thermostat) are vital components of the bleed air, exhaust and heating installation, and as such are covered in Section XI.

4-52. Fuel Boost Pump

a. *Removal (fig. 4-33).*

(1) Remove wiring harness connector and tube assemblies from fuel boost pump.

(2) Remove four attaching bolts, (fig. 4-34) eight washers and four nuts. Remove fuel boost pump from skid assembly.

b. *Installation.*

(1) Install replacement pump on skid assembly and secure with attaching bolts, washers and nuts.

(2) Connect tube assemblies to pump using new packings. Connect wiring harness connector to pump.

4-53. Fuel Float Tank Assembly and Switch

a. *General.* The fuel float tank (fig. 4-34) is equipped with a fluid limit switch which automatically shuts down the power unit in the event that no fuel is transmitted to the fuel float tank. This safety feature is designed so that the fuel control will not be allowed to run dry and subsequently malfunction.

b. *Removal.*

(1) Remove plug and drain fuel tank.

(2) Remove tube assemblies and wiring harness connector from fuel float tank.

(3) Remove two attaching nuts, washers and bolts and remove fuel float tank from skid assembly.

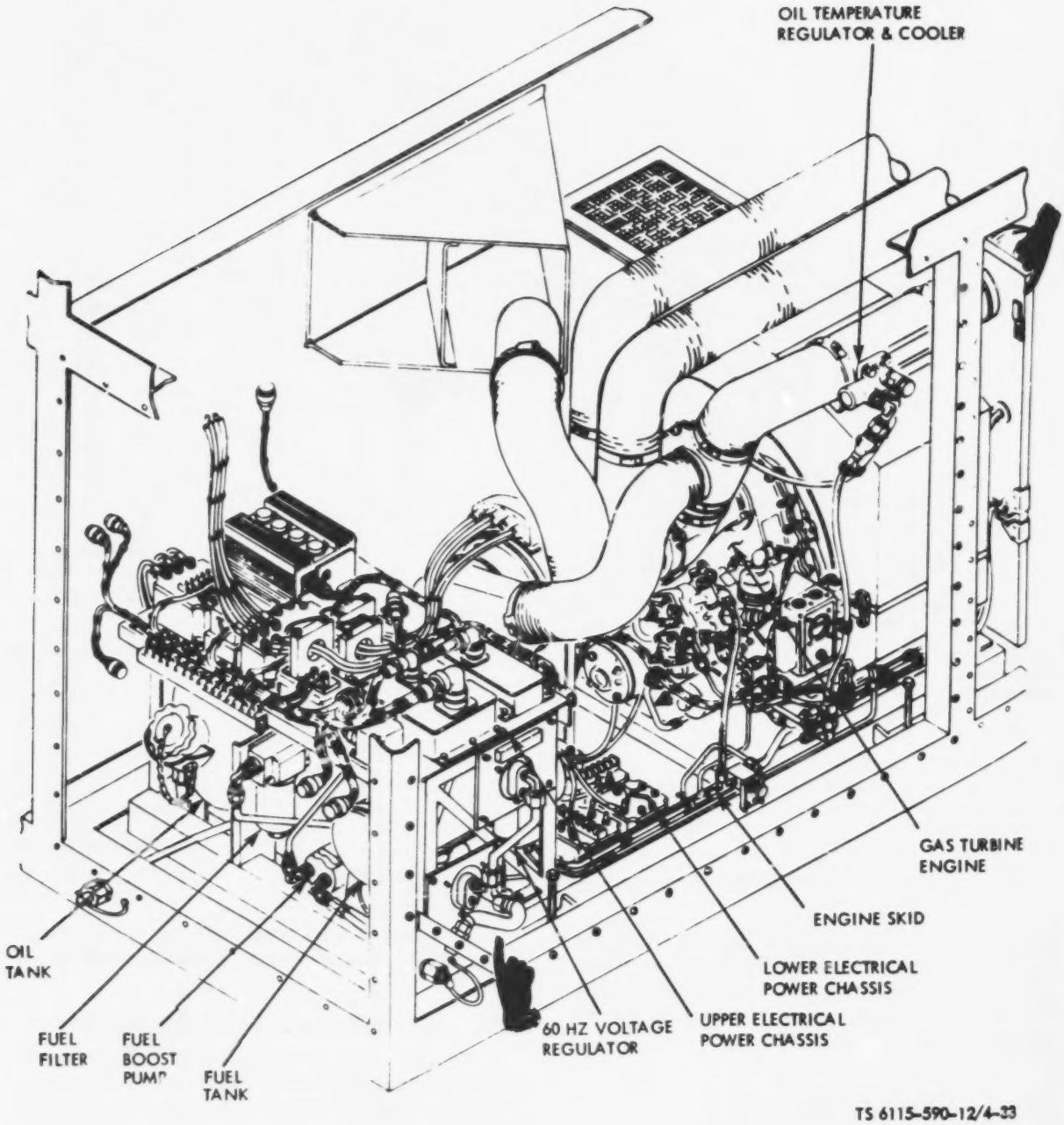


Figure 4-33. Engine and Skid Assembly (TS 6115-590-12/4-33).

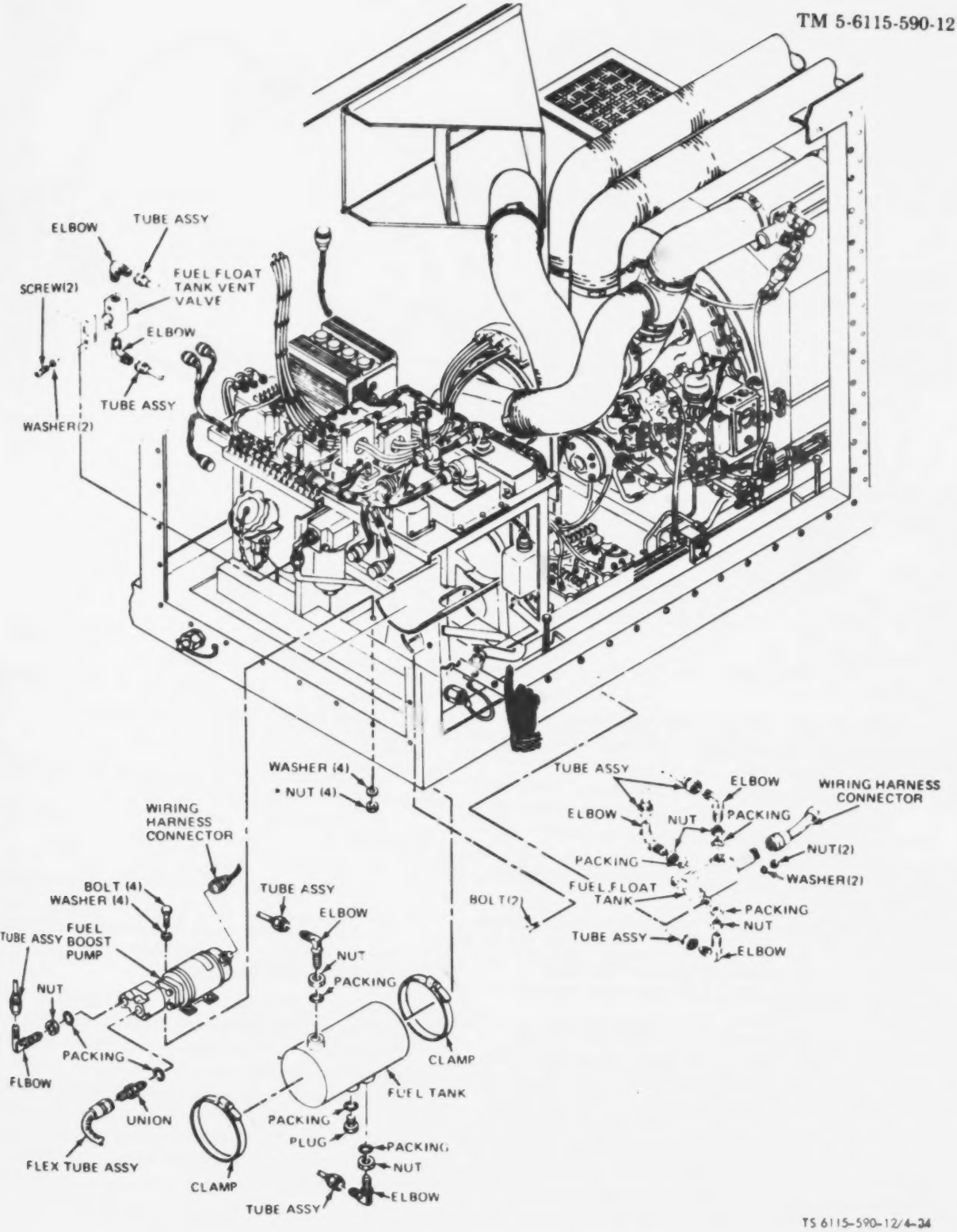


Figure 4-34. Engine and Skid Assembly Component Replacement (TS 6115-590-12 4-34)

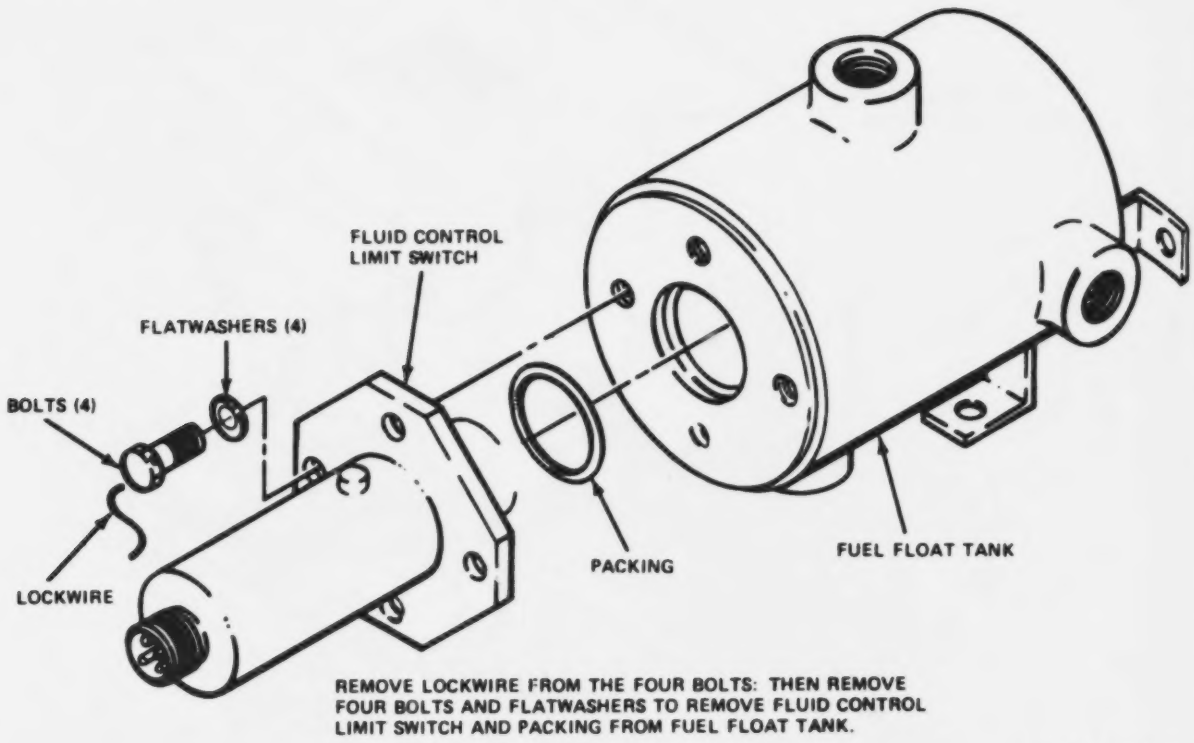

FLUID CONTROL LIMIT SWITCH
FLATWASHERS (4)
BOLTS (4)
LOCKWIRE
PACKING
FUEL FLOAT TANK
REMOVE LOCKWIRE FROM THE FOUR BOLTS: THEN REMOVE FOUR BOLTS AND FLATWASHERS TO REMOVE FLUID CONTROL LIMIT SWITCH AND PACKING FROM FUEL FLOAT TANK.
TS 6115-590-12/4-35

Figure 4-35. Fuel Float Tank Assembly and Fluid Control Limit Switch (TS 6115-590-12/4-35).

c. Disassembly. Disassemble fuel float tank and fluid limit switch in accordance with the instructions contained in figure 4-35.

d. Cleaning, Inspection and Repair.

(1) Clean all non-electrical parts with an approved cleaning solvent and dry thoroughly with filtered compressed air.

(2) Inspect hardware for stripping, cross-threading, or other damage.

(3) Inspect tank for cracks, dents or other damage.

(4) Inspect switch for external damage.

(5) Replace packing each time tank assembly is disassembled.

(6) Replace damaged or inoperative switch.

(7) If tank is damaged beyond repair, replace it.

(8) Use new hardware as required.

e. Fluid Control Limit Switch Test. Test the fluid control limit switch in accordance with the procedures given on figure 4-36.

f. Reassembly. Reassemble switch and tank in reverse order of disassembly as shown on figure 4-35.

g. Installation.

(1) Install replacement fuel float tank in reverse order of removal.

(2) Install plug in bottom of fuel tank.

4-54. Fuel Float Tank Vent Valve

a. Removal.

(1) Remove the two tube assemblies (fig. 4-34) and elbows from vent valve.

(2) Remove two screws and washers and remove valve from mounting bracket.

b. Installation.

(1) Install replacement valve in reverse order of removal.

(2) Install elbows and connect tube assemblies.

4-55. Oil Tank Assembly

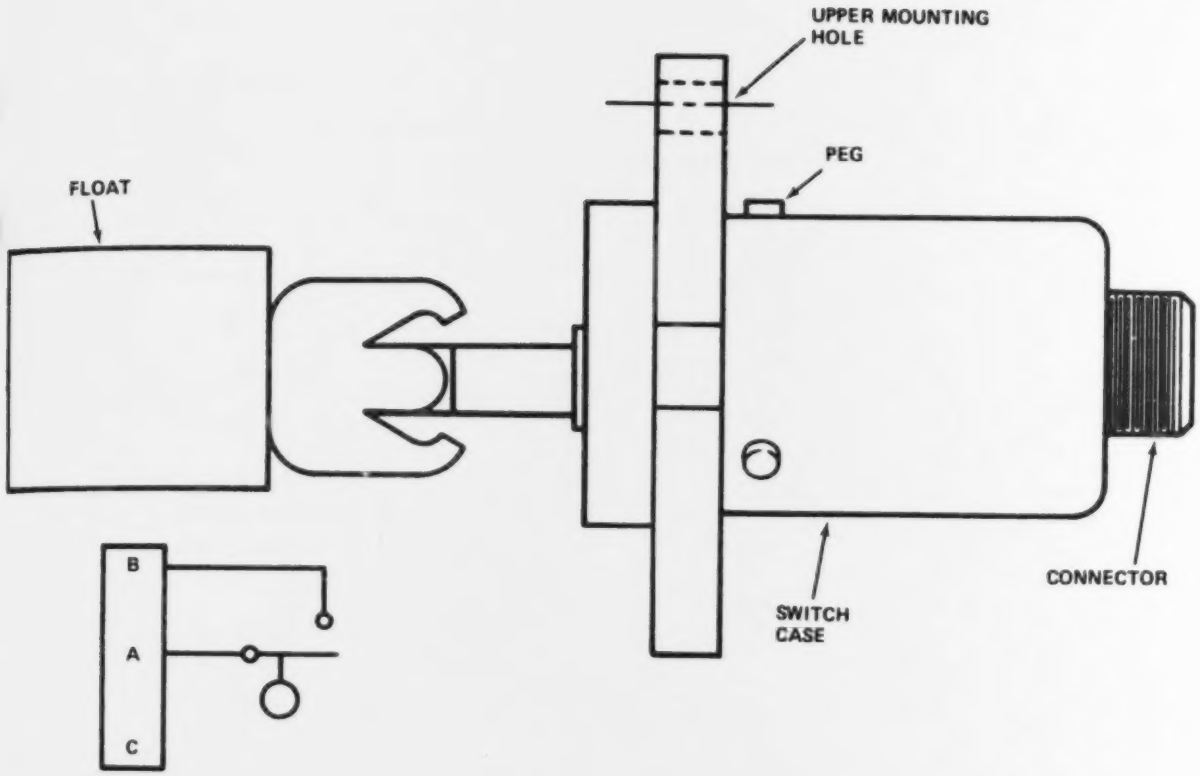
a. Removal. Drain all oil from tank assembly (fig. 4-33). Remove tube assemblies from oil tank, loosen clamp strap on tank cradle, and remove oil tank assembly from cradle.

b. Installation. Install replacement oil tank assembly in place of cradle and secure with a clamp strap. Reconnect tube assemblies to tank using new gaskets. Insure that drain plug is securely tightened. Refill oil tank.

4-56. Fuel Tank Assembly

a. Removal.

(1) Remove drain plug from fuel tank (fig. 4-33) and allow all fuel to drain from tank.



SWITCH SCHEMATIC DIAGRAM

NOTE: PRIOR TO CONTINUITY CHECK, POSITION SWITCH HORIZONTALLY SO THAT THE PEG ON THE SWITCH CASE WHICH ALIGNS WITH THE UPPER MOUNTING HOLE IS IN THE "UP" POSITION.

STEP 1 - ROTATE FLOAT TO "UP" POSITION. USING OHMMETER, CHECK FOR CONTINUITY BETWEEN PIN A AND PIN B. CHECK FOR OPEN CIRCUIT BETWEEN PIN A AND PIN C.

STEP 2 - ROTATE FLOAT TO "DOWN" POSITION. USING OHMMETER, CHECK FOR CONTINUITY BETWEEN PIN A AND PIN C. CHECK FOR OPEN CIRCUIT BETWEEN PIN A AND PIN B.

STEP 3. WITH WIRING HARNESS DISCONNECTED, SHORT PINS A AND B OF THE POWER SOURCE. THE NO FUEL LIGHT SHOULD GO OUT AND THE SOLENOID WILL CLICK INDICATING THAT THE ELECTRICAL SYSTEM UP TO THE INPUT PLUG IS SATISFACTORY.

TS 6115-590-12/4-36

Figure 4-36. Fuel Float Tank Switch Test (TS 6115-590-12/4-36).

(2) Disconnect tube assemblies (fig. 4-34) and loosen clamps and slide from each end of fuel tank. Remove fuel tank from skid assembly.

b. Installation.

(1) Install fuel tank assembly in reverse or removal. Secure with clamps.

(2) Reconnect tube assemblies.

57. Electrical

Electrical components on the engine skid assembly consists of the upper and lower electrical power chassis, their components, generators, and wiring harnesses.

4-58. Upper Electrical Power Chassis Assembly

a. General. The upper electrical power chassis assembly consists of the 60 and 400 Hz voltage regulators, battery charger assembly, protective panels and electrical harness assembly. This paragraph describes procedure for maintaining the chassis assembly. Access to the chassis assembly is

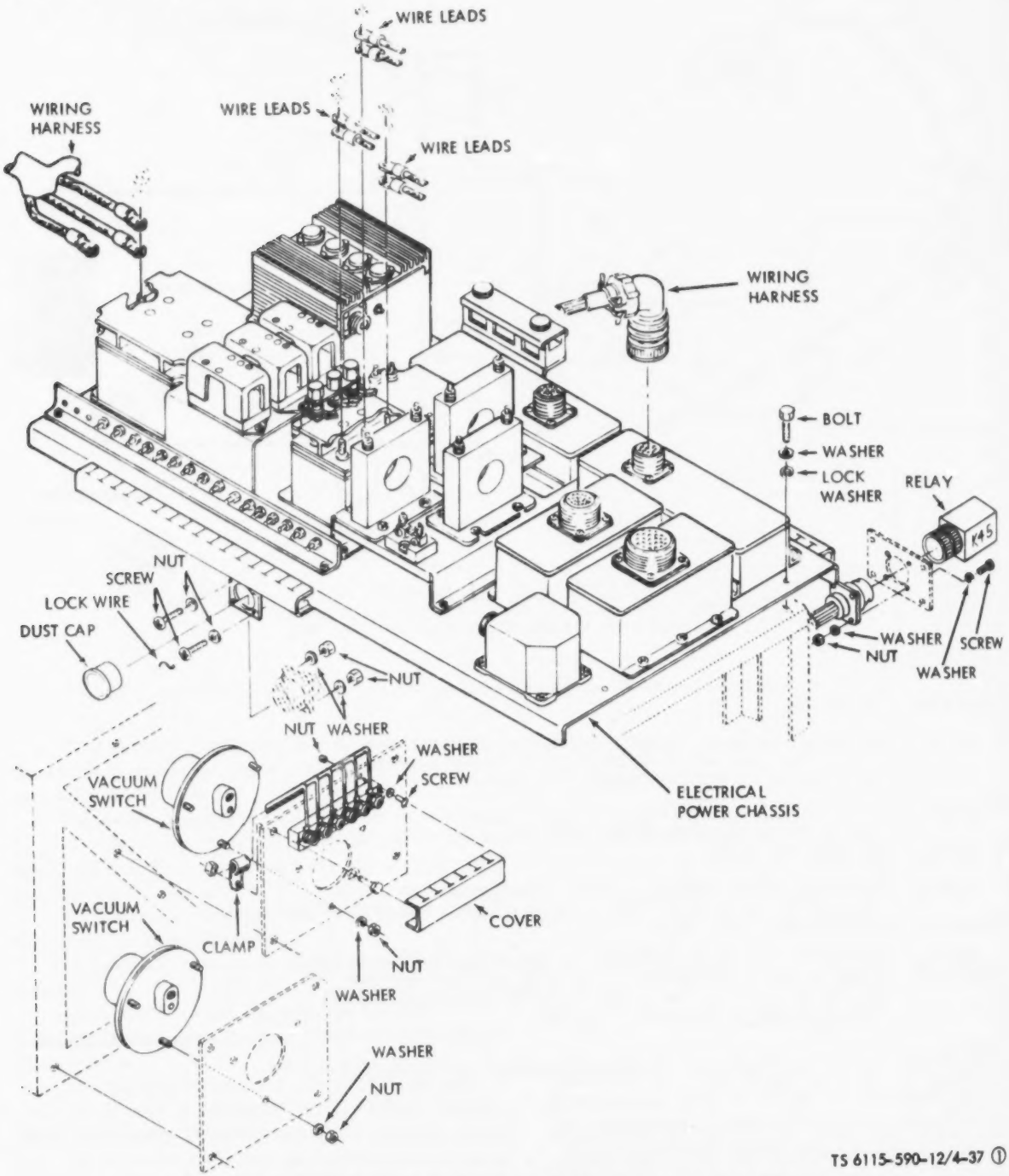


Figure 4-37. Upper Electrical Power Chassis Component Replacement (Sheet 1 of 2) (TS 6115-590-12/4-37[1]).

obtained by removing the engine and skid access panel shown in figure 4-32. Tag or otherwise identify electrical connections as removed to aid in reassembly.

b. Electrical Harness.

(1) *Removal.*

(*a*) Tag and disconnect all connectors and electrical leads from components on chassis. (fig. 4-37).

(*b*) Remove all securing clamps and mounting hardware and remove harness assembly.

(2) *Cleaning and Inspection.*

(*a*) Clean connectors with filtered com-

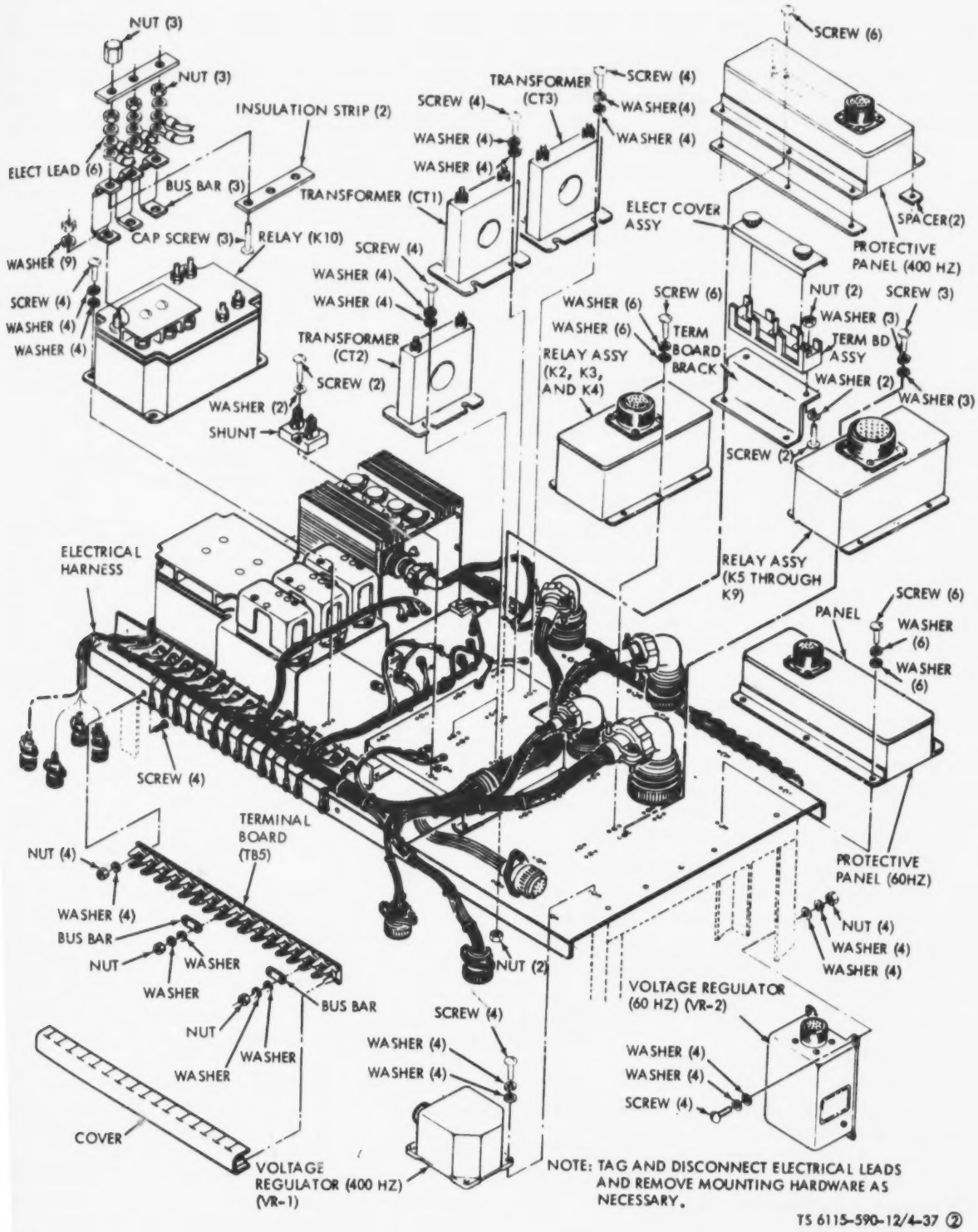


Figure 4-37. Upper Electrical Power Chassis Component Replacement (Sheet 2 of 2) (TS 6115-590-12/4-37②).

pressed air and wipe wires with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect harness for damaged or corroded connectors, frayed or burned insulation and evidence of other damage.

(3) *Test.* Test individual wires for continuity.

(4) *Installation.* Install replacement harness assembly in reverse order of removal.

c. Battery Charger (fig. 4-38).

(1) *Removal.* Tag and disconnect electrical harness connnector plug from the battery charger. Remove four screws, four flat washers and four lock washers. Remove battery charger.

(2) *Cleaning and Inspection.*

(*a*) Clean battery charger with dry filtered compressed air or a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect battery charger for corrosion, cracks, damaged threads, excessive heat, or other evidence of damage.

(3) *Test.* Disconnect leads from the positive and negative terminals on the battery charger and connect a multimeter to the positive and negative terminals of the charger. Start the power unit as described in paragraph 2-10 and observe the voltage output on the multimeter. Vary the output of the charger by turning the adjustment screw. Turn the adjusting screw clockwise to increase the voltage output and counterclockwise to decrease the voltage output.

CAUTION

Do not exceed an output of 30 volts. If the output voltage can be read on the multimeter and the voltage can be adjusted between 24 and 30 volts, the charger is operating satisfactorily.

(4) *Adjustment.* With the leads disconnected from the positive and negative terminals and a multimeter connected, turn the voltage adjust screw until the voltage output is 28 volts. Disconnect the multimeter and reconnect the leads to the positive and negative terminals of the battery charger.

(5) *Installation.* Install battery charger in reverse order of removal.

d. Voltage Regulator VR-2 60 Hz.

(1) *Removal.*

(*a*) Tag and disconnect wiring harness connector from voltage regulator (fig. 4-37).

(*b*) Remove attaching screws, nuts and washers and remove regulator from support frame below upper electrical power chassis.

(2) *Cleaning and Inspection.*

(*a*) Clean voltage regulator with filtered compressed air or wipe with clean rag moistened with an approved cleaning solvent. Clean receptacle with filtered compressed air or an electrician's brush.

(*b*) Visually inspect regulator for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Test.* The following test may be used to isolate a faulty voltage regulator by substituting for the regulator function. If 60 Hz voltage is incorrect or not available, perform test as follows.

(*a*) Start the power unit as described in paragraph 2-10, and operate the 60 Hz electrical system as described in paragraph 2-12a.

(*b*) With the 60 Hz electrical system operating, disconnect plug P32 from voltage regulator VR-2. Using an adjustable 5,000 ohm, 10 watt potentiometer, apply 24V DC through a 25 ohm, 50 watt resistor into pins J and E on plug P32.

(*c*) Adjust potentiometer until voltage begins to increase on panel 60 Hz AC voltmeter and increase voltage to 120V AC line-to-neutral.

NOTE

If load contactor trip indicator illuminates due to undervoltage, reset load contactor switch and increase voltage to 120V AC.

(*d*) If 120 volts are obtainable and the load contactor does not trip, the 60 Hz generator output is correct and the voltage regulator has failed. If 120 volts are not obtainable, the generator or other 60 Hz components are defective. Refer to paragraph 4-61 for 60 Hz generator maintenance instructions.

(4) *Installation.* Install voltage regulator in reverse order of removal.

e. Voltage Regulator VR1 - 400 Hz.

(1) *Removal (fig. 4-37).*

(*a*) Tag and disconnect wiring harness connector from voltage regulator.

(*b*) Remove attaching screws and washers and remove voltage regulator from upper electrical power chassis.

(2) *Cleaning and Inspection.*

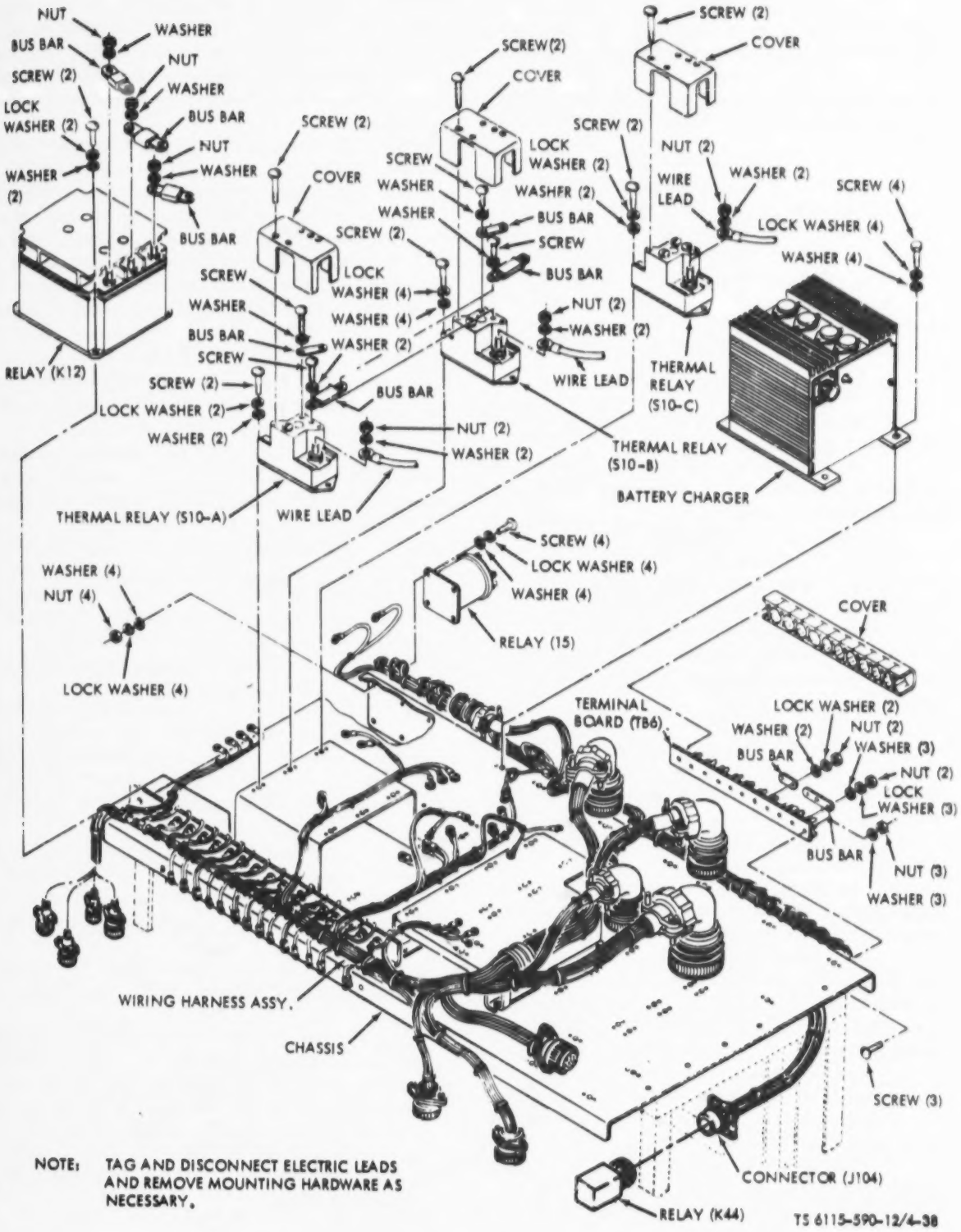
(*a*) Clean voltage regulator with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent. Clean receptacle with filtered compressed air or an electrician's brush.

(*b*) Visually inspect regulator for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Testing.* The following test may be used to isolate a faulty voltage regulator by substituting for the regulator function. If 400 Hz voltage is incorrect or not obtainable, perform the test as follows.

(*a*) Start the power unit as described in paragraph 2-10, and operate the 400 Hz electrical system as described in paragraph 2-12b.

(*b*) With the 400 Hz electrical system operating, disconnect plug P30 from voltage regulator VR1. Using an adjustable 5,000 ohm, 10 watt potentiometer, apply 24V DC through a 25 ohm, 50 watt resistor to pins J and E on plug P30.



NOTE: TAG AND DISCONNECT ELECTRIC LEADS AND REMOVE MOUNTING HARDWARE AS NECESSARY.

Figure 4-38. Upper Electrical Power Chassis Component Replacement (TS 6115-590-12/4-38).

(c) Adjust potentiometer until voltage begins to increase on panel 400 Hz AC voltmeter, and increase voltage to 120V AC line-to-neutral.

NOTE

If load contactor trip indicator illuminates due to under-voltage, reset load contactor switch and increase voltage to 120V AC.

(d) If 120 volts are obtainable and the load contactor does not trip, the 400 Hz generator output is correct and the voltage regulator has failed. If 120 volts are not obtainable, the generator or other 400 Hz components are defective. Refer to paragraph 4-62 for 400 Hz generator maintenance instructions.

(4) *Installation.* Install voltage regulator in reverse order of removal.

f. Relay assemblies K2,K3,K4 and K5 through K9 (fig. 4-37).

(1) *Removal.*

(a) Tag and disconnect wiring harness connector plug on relay assembly.

(b) Remove six (6) attaching screws and washer and remove relay assemblies from upper electrical power chassis.

(2) *Cleaning and Inspection.*

(a) Clean relay assembly with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent. Clean receptacle with filtered compressed air or an electrician's brush.

(b) Visually inspect relay assembly for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Test.*

(a) Remove connector P3 from relay assembly (K2,K3,K4) and connect a source of 24V DC across pins S and H on relay assembly connector J3.

(b) Check for continuity between pin M and N, pin A and L, and pin P and R.

(c) Move the 24V DC source connection at pin S to pin G so that the 24V DC is connected across pins G and H of connector J3.

(d) Check that there is continuity between the four pins A, B, C and D. Check for continuity between pins P, K and R. Check for continuity between pin E and pin F, pin S and pin J, and pin V and pin W.

(e) Disconnect the 24V DC source from connector J3. If continuity is not present between the pins specified in steps (b) and (d), the relay assembly is defective.

(f) Remove connector P4 from relay assembly K5 through K9 and connect the positive side of a source of 24V DC to pin E and the negative side to pin F on the relay assembly connector J4. Check that there is continuity across the following pins on connector J4: K and L, H and J, M and Q, G and D.

(g) Without removing the 24V DC connections from pins E and F, jumper the positive side of the source so that it is connected to both pin E and pin W (pin F is a common negative for both relay coils). The circuit between pins M and Q should now check open.

(h) Remove the positive jumper from pin W and connect it to pin e so that the positive 24V DC is not connected to pins E and e. Jumper the negative side of the voltage source to pin f, so that the negative 24V DC is connected to both pin F and pin f. The circuit between pin G and pin d and between pin Y and pin Z should check open. The circuit between pins b and c should show continuity.

(i) Remove the jumpers from the connector and connect the 24V DC source across pins t and F. Check for continuity between pins a and s, and between pins n and p. There should be continuity.

(j) Move the 24V DC source connections to place the 24V DC across pins W and X. Check for continuity between pins R and S, and for continuity between three (3) pins T, U and V.

(k) Remove the 24V DC source. Check for continuity between pins Y and Z, C and B, g and h, and between the three pins A, O and N. If the circuit between pins does not check as outlined in steps (f) through (k), the relay assembly is defective.

(4) *Installation.* Install replacement relay assembly in reverse order of removal.

g. Protective Panel (two used, 60 Hz and 400 Hz).

(1) *Removal.* Tag and disconnect wiring harness connector plug from protective panel figure 4-37. Remove six (6) attaching screws and washers and remove protective panel.

(2) *Cleaning and Inspection.*

(a) Clean protective panel assembly with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent. Clean receptacle with filtered compressed air or an electrician's brush.

(b) Visually inspect panel for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Test.* If either the 400 Hz main contactor trip indicator lamp or the 60 Hz load contactor trip indicator lamp illuminates and 60 Hz or 400 Hz power is lost, reset the 400 Hz main contactor switch or the 60 Hz load contactor switch, as applicable. If the system trip indicator lamp again illuminates and power is lost, the protective panel for the applicable system has failed.

NOTE

If upon resetting either the 60 Hz load contactor or the 400 Hz main contact switch, the system ammeter pegs full scale, check for a short circuit or overload condition in the system.

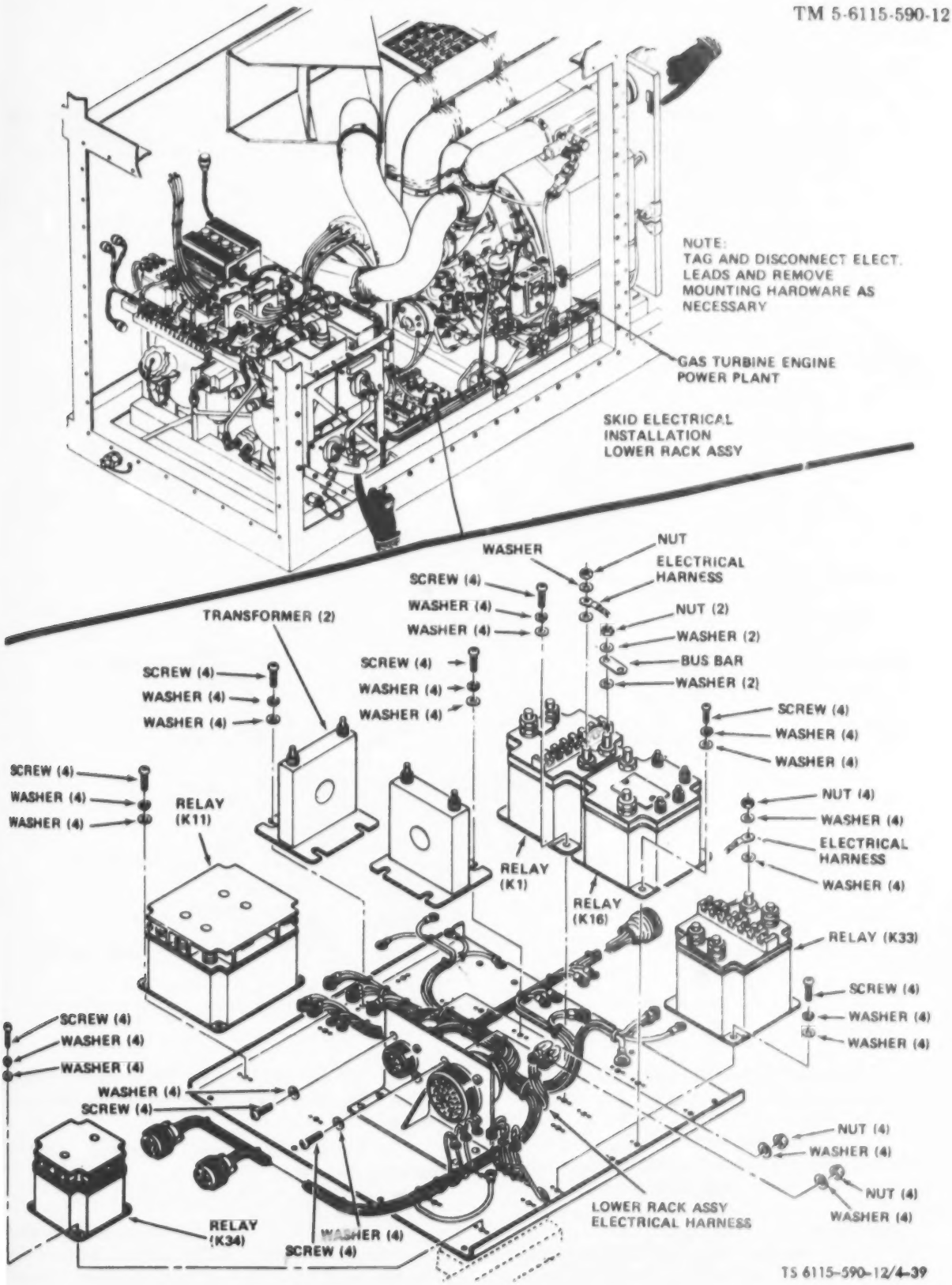


Figure 4-39. Lower Electrical Power Chassis Assembly Component Replacement. (TS 6115-590-12/4-39)

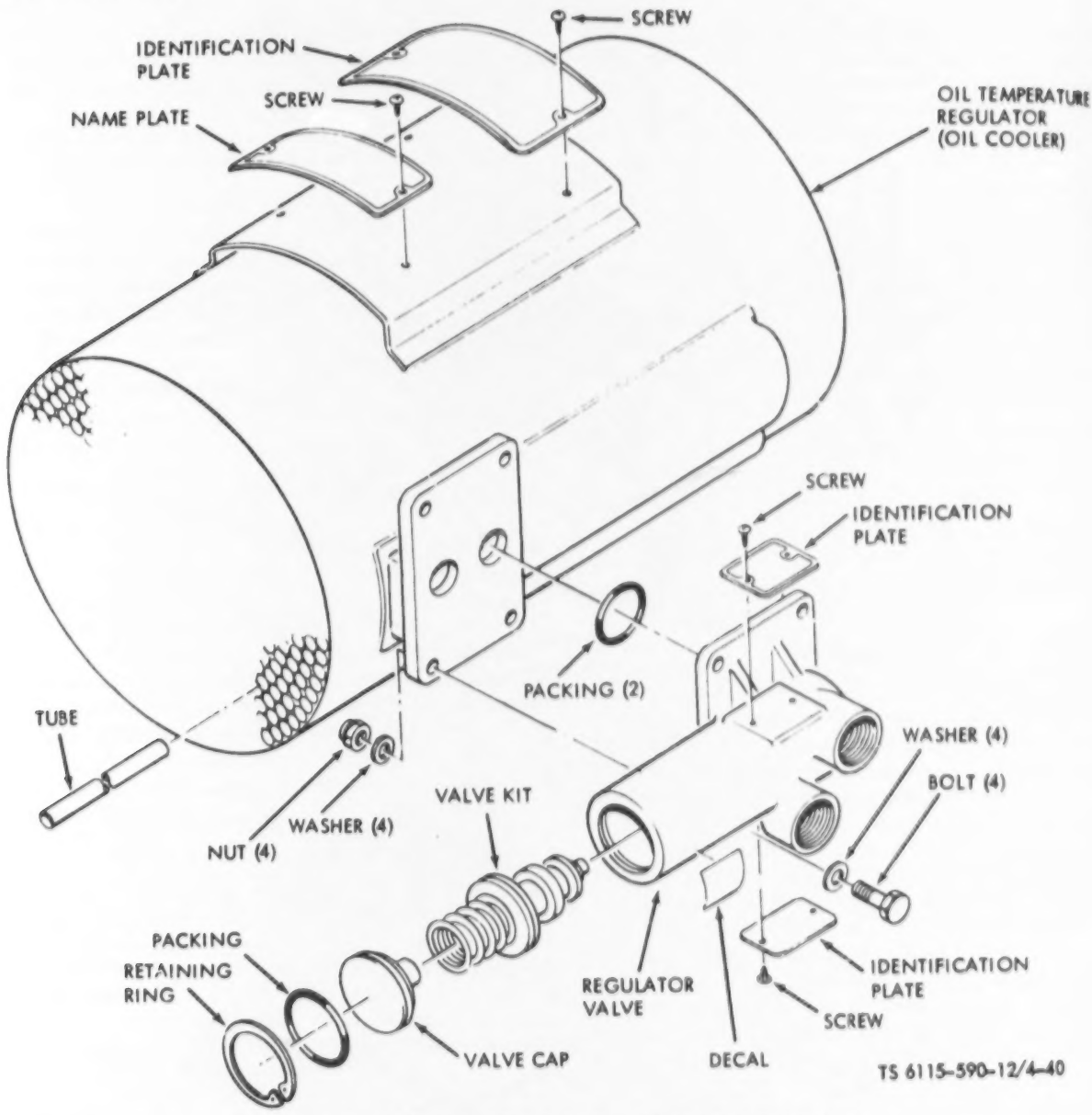


Figure 4-40. Oil Cooler and Regulator Assembly (TS 6115-590-12/4-40)

(4) *Installation.* Install replacement protective panel in reverse order of removal.

h. Relay (K10).

(1) *Removal.* Tag and disconnect electrical connections to relay (fig. 4-37). Remove four screws, four flat washers, and four lock washers. Remove relay.

(2) *Cleaning and Inspection.*

(*a*) Clean relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect relay for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

i. Relay (K12).

(1) *Removal.* Tag and disconnect electrical connections to relay (fig. 4-38). Remove four screws, four flat washers, and four lock washers. Remove relay.

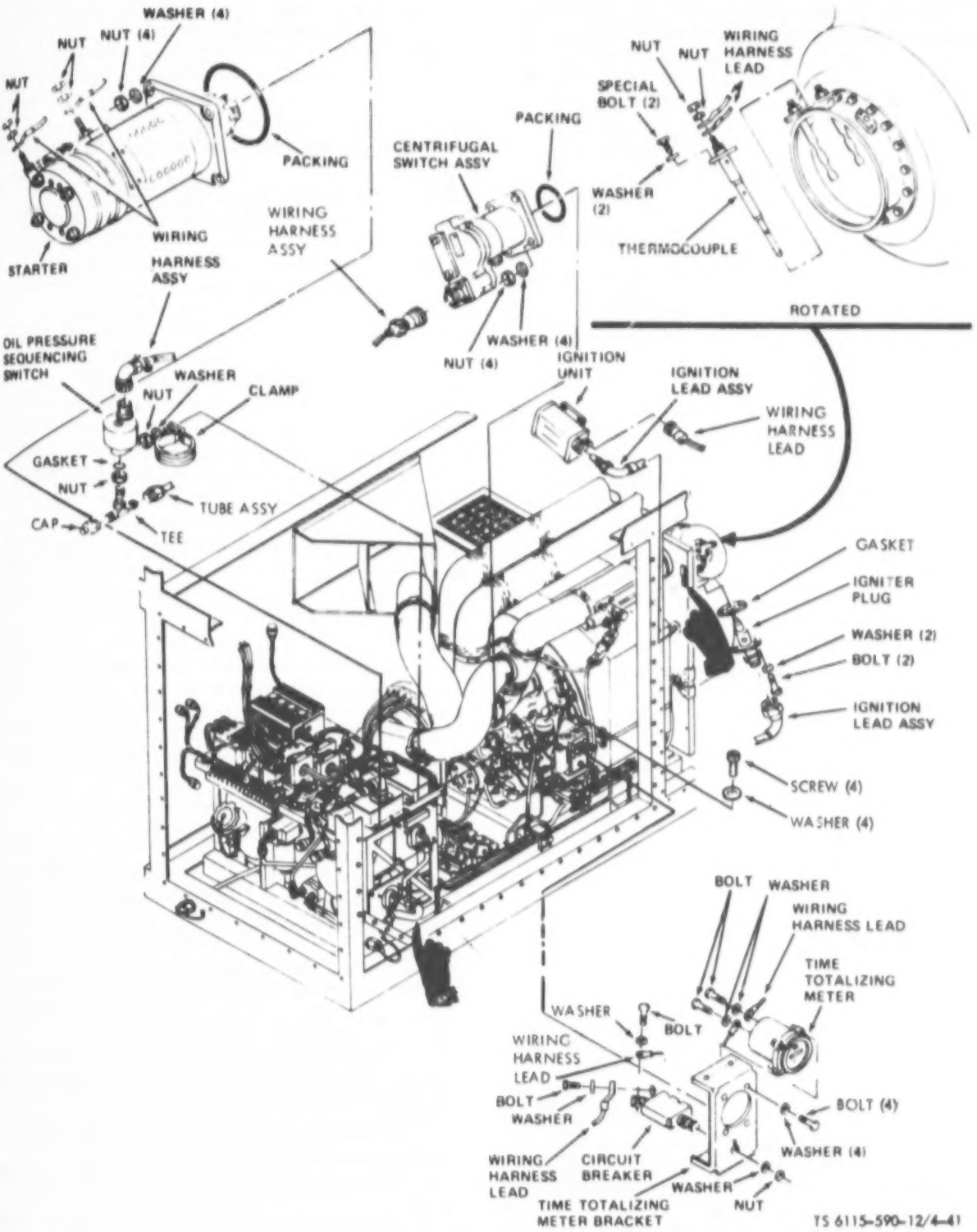


Figure 4-41. Engine Accessory Component Replacement (TS 6115-590-12/4-41)

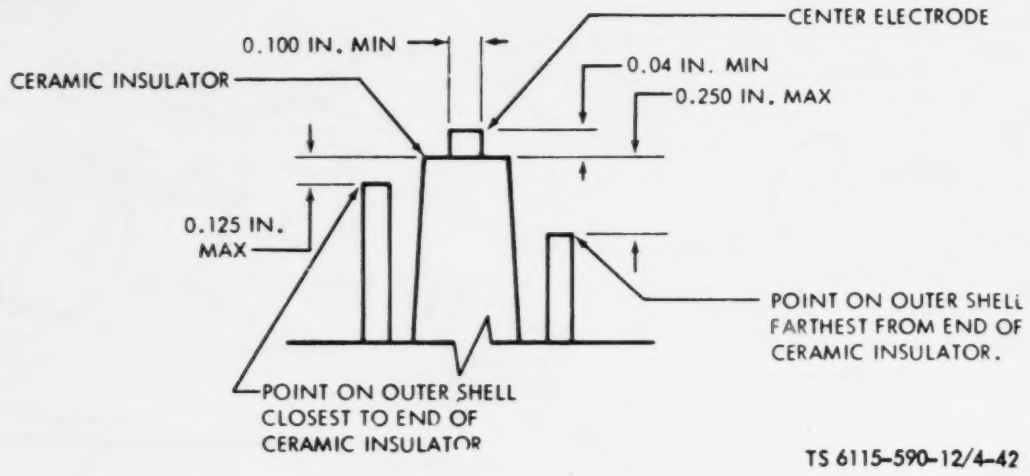

CENTER ELECTRODE
0.100 IN. MIN
CERAMIC INSULATOR
0.04 IN. MIN
0.250 IN. MAX
0.125 IN. MAX
POINT ON OUTER SHELL FARTHEST FROM END OF CERAMIC INSULATOR.
POINT ON OUTER SHELL CLOSEST TO END OF CERAMIC INSULATOR
TS 6115-590-12/4-42

Figure 4-42. Igniter Plug Erosion Limits (TS 6115-590-12/4-42).

(2) *Cleaning and Inspection.*

(*a*) Clean relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect relay for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedure.

j. Relay (K15).

(1) *Removal.* Tag and disconnect electrical connections to relay (fig. 4-37). Remove four nuts, eight flat washers, eight lock washers, and four screws. Remove relay.

(2) *Cleaning and Inspection.*

(*a*) Clean relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect relay for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install replacement relay in reverse order of installation.

k. Current Transformer 400.Hz CT1, CT2, CT3 (fig. 4-37).

(1) *Removal.* Tag and disconnect electrical connections to transformer and electrical leads passing through the center of the transformer. Remove four attaching screws and washers and remove transformer from power chassis.

(2) *Cleaning and Inspection.*

(*a*) Clean transformer with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect transformer for corrosion, cracks, damaged threads, excessive heat or other evidence of damage.

(3) *Installation.* Install replacement transformer in reverse order of removal.

l. Thermal Relay (three used: S10-A, S10-B, S10-C) (fig. 4-38).

(1) *Removal.* Remove two screws and cover from relay. Tag and remove electrical leads and bus bars from relay. Remove two screws, two flat washers and two lock washers from relay. Remove thermal relay.

(2) *Cleaning and Inspection.*

(*a*) Clean relay with compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect relay for corrosion, cracks, damaged threads, excessive heat or other evidence of damage.

(3) *Installation.* Install replacement relay in reverse order of removal procedures.

m. Shunt R1.

(1) *Removal.* Tag and remove electrical leads from shunt (fig. 4-37). Remove two (2) attaching screws and washers and remove shunt from power chassis.

(2) *Cleaning and Inspection.*

(*a*) Clean shunt with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect shunt for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install replacement shunt in reverse order of removal.

n. Terminal Boards TB5 and TB6 (fig. 4-38 and 4-39).

(1) *Removal.* Remove snap on cover from terminal board. Tag and remove electrical connections and bus bars from terminal board. Remove

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attaching hardware and remove terminal board from power chassis.

(2) *Cleaning and Inspection.*

(*a*) Clean terminal board with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect terminal board for evidence of cracks, corrosion, damaged threads or other evidence of damage.

(3) *Installation.* Install replacement terminal board in reverse order of removal.

o. Relay K44.

(1) *Removal.* Unscrew relay connector and pull the relay (fig. 4-38) from the connector (J4).

(2) *Cleaning and Inspection.*

(*a*) Wipe relay with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect relay for damaged pins for connector threads or other evidence of damage.

(3) *Test.* Apply 24V DC to pins A and B of the relay and check that there is continuity between pins D and E. Remove the 24V DC and check that the circuit between pins D and E opens. If the relay does not perform as outlined, it is defective.

(4) *Installation.* Install replacement relay in reverse order of removal.

p. Wiring Harness Assembly.

(1) *Removal.* Remove wiring harness assembly (fig. 4-37) only as required for access to other components or to replace damaged parts.

NOTE

Tag or otherwise identify all connectors, terminals and wire leads and location of supporting clamp as removed to facilitate reassembly.

(2) *Cleaning and Inspection.*

(*a*) Clean parts with filtered compressed air, or wipe with a clean rag moistened with an approved cleaning solvent, or by brushing with an electrician's brush.

(*b*) Visually inspect for burned, bent, loose, corroded or otherwise damaged connector pins and terminals. Inspect insulation for burns, chafing and deterioration. Inspect wiring for breaks, loose connections or other obvious damage. Replace all damaged parts.

(3) *Repair.* Replace damaged terminals, connectors and receptacles by unsoldering connections, installing replacement part and soldering in accordance with Military Specification MIL-S-6872 using SN60 solder that conforms to Federal Specification QQ-S-571.

4-59. Lower Electrical Power Chassis Assembly

a. General. The lower electrical power chassis assembly consists primarily of relays, transformers, and electrical harness assemblies. This paragraph describes procedures for maintaining the chassis assembly. Access to the chassis assembly is obtained by removing the engine and skid access panel shown in Figure 4-32. Tag or otherwise identify electrical connections as they are removed to aid in reassembly.

b. Wiring Harness Assemblies.

(1) *Removal.*

(*a*) Tag and disconnect all connectors and electrical leads from components on chassis (fig. 4-39).

(*b*) Remove all securing clamps and mounting hardware and remove harness assemblies.

(2) *Cleaning and Inspection.*

(*a*) Clean connectors with filtered compressed air and wipe wires with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect harnesses for damaged or corroded connectors, frayed or burned insulation and evidence of other damage.

(3) *Test.* Test individual wires for continuity.

(4) *Installation.* Install replacement harnesses in reverse order of removal.

c. Relay (K1).

(1) *Removal.* Remove terminal post cover from relay. Tag and disconnect electrical connections from relay. Remove four screws and eight washers. Remove relay.

(2) *Cleaning and Inspection.*

(*a*) Clean relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect relay for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install replacement relay in reverse order of removal procedures.

d. Relay (K11).

(1) *Removal.* Remove terminal post cover from relay. Tag and disconnect electrical connections from relay. Remove four screws and eight washers. Remove relay.

(2) *Cleaning and Inspection.*

(*a*) Clean relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect relay for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install replacement relay in reverse order of removal procedures.

e. Relay (K16).

(1) *Removal.* Tag and disconnect electrical connections and bus bars from relay. Remove attaching screws and washers and remove relay from power chassis.

(2) *Cleaning and Inspection.*

(*a*) Clean relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect relay for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install replacement relay in reverse order of removal.

f. Relay (K33).

(1) *Removal.* Tag and disconnect electrical connectors from relay. Remove four screws and eight washers from relay. Remove relay.

(2) *Cleaning and Inspection.*

(*a*) Clean relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect relay for corrosion, cracks, damaged theads or other evidence of damage.

(3) *Installation.* Install replacement relay in reverse order of removal.

g. Relay (K34).

(1) *Removal.* Remove terminal post cover from relay. Tag and disconnect electrical connections from relay. Remove four screws and eight washers from relay. Remove relay.

(2) *Cleaning and Inspection.* Clean relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(3) *Installation.* Install replacement relay in reverse order of removal procedures.

h. Current Transformer (two used: CT4 and CT5).

(1) *Removal.* Tag and disconnect electrical connections to transformer. Tag and disconnect electrical connection passing through the center of transformer. Remove four screws and eight washers from transformer. Remove transformer.

(2) *Cleaning and Inspection.*

(*a*) Clean transformer with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

4-60. Generator, 400 Hz

a. General. Maintenance of the 400 Hz generator at organizational level consists only of inspection. If the generator fails the inspection, notify direct support maincenance.

b. Inspection. Remove generator terminal cover and inspect terminals and wiring for corrosion, loose connections and terminals. Inspect wiring for damaged insulation and burned wires. Inspect electrical harness connector for loose or bent pins and damaged theads. Replace damaged parts.

c. DELETED.

4-61. Generator, 60 Hz

a. General. Maintenance of the 60 Hz generator at organizational level consists only of inspection. If the generator fails the inspection, notify direct support maintenance.

b. Inspection. Remove generator terminal cover and inspect terminals and wiring for corrosion, loose connections and terminals. Inspect wiring for damaged insulation and burned wires. Inspect electrical harness connector for loose or bent pins and damaged threads. Replace damaged parts.

c. DELETED.

4-62. Lines and Hoses

a. Removal. Remove lines and hoses only as required. Tag or otherwise identify connection points, routing, orientation of fittings and location of supporting clamps for aid at reassembly.

b. Cleaning and Inspection.

(1) Clean lines and hoses with an approved cleaning solution.

(2) Visually inspect lines and hoses for cracks, corrosion, damaged threads and other obvious damage. Replace all damaged parts.

c. Installation. Install lines and fittings in reverse order of removal

3. Oil Temperature Regulator Assembly

Removal (fig. 4-40).

(1) Remove oil hose assemblies from oil tem-ature regulator valve. Drain hoses of residual oil l discard packing.

(2) Loosen attaching clamps and remove hose emblies from oil temperature regulator. Remove ulator from its cradle.

Installation.

(1) Install replacement regulator assembly on dle. Replace hose assemblies on each end of ulator and secure with attaching clamps.

(2) Reconnect oil hose assemblies to regulator ve using new packing.

4. Regulator Valve

Removal (fig. 4-40).

(1) Remove oil hose assemblies from regulator ve and drain hoses of residual oil.

(2) Remove attaching bolts, nuts and washers l remove regulator valve and two packings from oil temperature regulator. Discard the packings.

Installation.

(1) Install new packings in place in oil temper-re regulator. Install replacement regulator valve place and secure with attaching bolts, nuts and shers. Tighten bolts securely.

(2) Reconnect hose assemblies to regulator ve using new packing.

5. Gas Turbine Engine

General. Maintenance of the gas turbine engine organizational maintenance level consists narily of inspection, servicing, testing and oval and replacement of peripheral accessories, ched to, but external to the gas turbine engine mbly.

6. Plenum, Turbine Exhaust

spect turbine exhaust plenum for signs of cor-on, cracks, dents, loose mounting bolts and evi-e of leakage or other obvious damage.

7. Igniter Plug

Removal.

WARNING

o not remove igniter plug or ignition unit un-s they have been grounded. The high-tension d must be grounded as it is removed from the niter plug. Ground by touching the contact ring in the lead to the igniter.

(1) Remove ignition lead (fig. 4-41) from er plug and ground it.

(2) Remove two attaching bolts and washers and remove igniter plug and gasket from engine combustion chamber.

b. Cleaning and Inspection.

(1) Clean igniter plug electrode by brushing with a stiff bristle brush. Wipe exterior of plug with a clean rag moistened with an approved cleaning solvent.

(2) Visually inspect plug for cracks, damaged threads, excessive burning, or other evidence of damage. Check electrode for adequate protrusion in accordance with figure 4-42.

c. Test. Connect a satisfactory ignition lead and a satisfactory ignition unit to the igniter plug. Connect a 28V DC power source. Plug must spark consistently at a rate of 10 sparks per second maximum.

d. Installation.

(1) Install satisfactory or replacement igniter plug in combustion chamber using new gasket.

(2) Coat threads of attaching bolts with a film of compound (Fel-Pro C-5). Secure plug with washers and coated bolts. Tighten bolts to 50 to 70 inch-pound torque.

(3) Reconnect ingition lead assembly to igniter plug.

4-68. Ignition Lead Assembly

WARNING

Do not remove igniter plug or ignition unit unless they have been grounded. The high-tension lead must be grounded as soon as it is removed from the igniter plug. Ground by touching the contact spring in the lead to the igniter.

a. Removal.

(1) Disconnect ignition lead assembly (fig. 4-41) from igniter plug and ground it. Then disconnect lead from ignition unit.

(2) Remove clamp holding ignition lead assembly to engine assembly and remove ignition lead.

b. Cleaning and Inspection.

(1) Clean ignition lead assembly with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(2) Visually inspect lead assembly for burned, bent, loose, corroded or otherwise damaged connectors. Inspect insulation for burns, chafing, breaks, deterioration, or other obvious damage.

c. Test. Check with an ohmeter for open lead or short circuit to insulation.

d. Installation. Reconnect a satisfactory or replacement ignition lead assembly to ignition unit and igniter plug.

4-69. Ignition Unit

WARNING

Do not remove the igniter plug or ignition unit unless they have been grounded. The high-tension lead must be grounded as soon as it is removed from the igniter plug. Ground by touching the contact spring in the lead to the igniter.

a. Removal.

(1) Remove wiring harness connector and ignition lead assembly from ignition unit (fig. 4-41).

(2) Remove four attaching bolts and washers securing ignition unit to fire wall and remove unit.

b. Cleaning and Inspection.

(1) Clean ignition unit by wiping with a clean rag moistened with an approved cleaning solvent.

(2) Visually inspect ignition unit for cracks, corrosion, damaged connector pins or other evidence of damage.

c. Test. Connect a satisfactory ignition lead assembly and igniter plug to ignition unit. Connect a 28V DC power source to the ignition unit. The ignition unit must cause the igniter plug to spark consistently at a rate of 10 sparks per second, maximum.

d. Installation.

(1) Install a satisfactory or replacement ignition unit in place on the fire wall and secure with attaching washers and bolts.

(2) Reconnect ignition lead assembly and wiring harness connector to ignition unit.

4-70. Oil Pressure Sequencing Switch

a. Removal.

(1) Remove wiring harness connector and tube assembly from oil pressure sequencing switch (fig. 4-41).

(2) Remove attaching nut and washer from clamp and remove oil pressure sequencing switch.

b. Cleaning and Inspection.

(1) Clean switch by wiping with a clean rag moistened with an approved cleaning solvent.

(2) Visually inspect switch for cracks, corrosion, damaged theads or other evidence of damage.

c. Test.

(1) Check switch actuation and closing and check continuity across receptacle pins. Circuit across pins A and B and across pins C and E should be open. Circuit across pins C and D should be closed.

(2) Install switch in a suitable holding device and connect a source of filtered and regulated compressed air to switch inlet port. Slowly apply air pressure and check actuation of the switch. At 2.5 to 3.5 psig inlet air pressure, the switch should actuate to close the circuits across pins A and B and across pins C and E, and open the circuit across pins C and D.

NOTE

The closing of the circuit across pins A and B and across pins C and E need not be simultaneous providing the circuit across pins A and B closes prior to the circuit across pins C and E, and that both circuits close within 2.5 to 3.5 psig inlet air pressure.

(3) Gradually decrease the inlet air pressure and check switch deactuations. At 1.5 psig minimum inlet pressure, the switch should deactuate to open the circuits across pins A and B and C and E, and close the circuit across pins C and D.

(4) If switch does not actuate and deactuate within specified limits, adjust switch as outlined in paragraph d. below.

d. Adjustment. Turn adjustment screw, located adjacent to the electrical connector as required, to bring switch actuation and deactuation within specified limits. If switch cannot be properly adjusted, replace switch.

e. Installation.

(1) Install satisfactory or replacement oil pressure sequencing switch in place on engine. Secure clamp with attaching washer and nut. Tighten nut securely.

(2) Reconnect tube assembly using new gasket and reconnect wiring harness connector to oil pressure sequencing switch.

4-71. Time Totalizing Meter

a. Removal.

(1) Remove four attaching screws and washers from engine bracket and remove time totalizing meter bracket (fig. 4-41) from engine.

(2) Remove wiring harness leads from meter. Remove four attaching bolts and washers and remove meter from bracket.

b. Installation.

(1) Install replacement time totalizing meter on bracket and secure with attaching washers and bolts. Tighten bolts securely.

(2) Reconnect wiring harness leads.

(3) Install meter and bracket in engine bracket and secure with attaching washers and screws. Tighten screws securely.

4-72. Circuit Breaker

a. Removal.

(1) Remove four attaching screws and washers from engine bracket and remove time totalizing meter bracket from engine.

(2) Remove wiring harness leads from circuit breaker (fig. 4-41).

(3) Remove attaching nut and washer from bracket and remove circuit breaker.

b. Installation.

(1) Install replacement circuit breaker in time totalizing meter bracket. Secure with attaching washer and nut.

(2) Connect wiring harness leads to circuit breaker.

(3) Install time totalizing meter bracket in engine bracket and secure with attaching washers and screws. Tighten screws securely.

4-73. Exhaust Gas Thermocouple

a. Removal.

(1) Remove wiring harness leads from thermocouple (fig. 4-41). Note that chromel lead is matched to CR marking and alumel lead is matched to AL marking.

(2) Remove two special attaching bolts and washers and remove thermocouple from engine and exhaust flange.

b. Cleaning, Inspection, and Replacement.

(1) Clean thermocouple using an approved solvent. Dry thoroughly with filtered compressed air.

(2) Visually inspect ceramic portion of thermocouple for cracks. If ceramic is cracked replace thermocouple.

(3) Inspect terminals for security in ceramic and for bending or damaged threads. If terminals fail to meet inspection requirements and are damaged beyond repair, replace thermocouple.

(4) Use a multimeter to check for continuity between terminals. If there is no continuity, replace thermocouple.

c. Installation.

(1) Coat threads of special attaching bolts with thin film of compound (Fel-Pro C-5).

(2) Install replacement thermocouple in engine exhaust flange.

(3) Secure thermocouple with washers and coated special attaching bolts. Tighten bolts to 50 to 75 inch-pound torque.

(4) Reconnect wiring harness leads to thermocouple.

NOTE

Insure chromel lead is matched to CR marking and alumel lead is matched to AL marking.

4-74. Engine Wire Harness

a. Removal. Prior to removing the engine wiring harness (fig. 4-41), tag or otherwise identify all connectors, terminals and electrical leads, and note routing and support clamp positions as an aid at installation. Remove harness at connectors and terminals.

b. Cleaning and Inspection.

(1) Clean wiring harness assembly with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(2) Visually inspect for burned, bent, loose, corroded or otherwise damaged connector pins and terminals. Inspect wiring for breaks, loose connections, or other obvious damage. Inspect insulation for burns, chafing and deterioration. Report defects to direct support maintenance for repair or replace defective wiring harness.

c. Test. Check continuity of wires using a multimeter or continuity light. Refer to figure 1-5 and FO-3 (located in back of manual) for wire routing. Continuity must be indicated through individual wires.

d. Installation. Install wiring harness assembly in reverse order of removal.

4-75. Fan Assembly, Oil Cooling

a. Removal.

(1) Loosen clamp and remove end of hose assembly from inlet flange of fan outlet flange and remove ends of support assembly and hose assembly from outlet flange of fan assembly, (fig. 4-43).

b. Installation.

(1) Install replacement cooling fan assembly on accessory gearcase using new packings.

(2) Secure fan assembly with attaching washers and bolts. Tighten bolts to 50 to 70 inch-pound torque.

(3) Reconnect end of hose assembly and duct support assembly to fan outlet flange. Tighten screws in support assembly securely. Reconnect end of hose assembly and clamp to fan inlet flange. Tighten clamp securely.

4-76. Fuel Control Assembly

a. Removal.

(1) Remove wiring harness connector from fuel solenoid and remove all tube assemblies from fuel control assembly (fig. 4-43).

(2) Remove four attaching nuts and three washers and carefully remove fuel control unit (fig. 4-44) from engine in a straight line to avoid damaging the fuel control drive shaft.

b. Installation.

(1) Refer to figure 4-43 for orientation and install replacement fuel control assembly. Insure that fuel control drive shaft splines are properly meshed.

(2) Secure in place with attaching washers and nuts. Tighten nuts to 50 to 70 inch-pounds torque.

(3) Refer to figure 4-44 and reconnect all tube assemblies to fuel control unit using new packings. Connect wiring harness connector to fuel solenoid valve.

c. Test.

(1) Connect fuel control assembly to engine analyzer as shown in fig. 4-16 and check acceleration limiter valve cracking pressure as follows.

(*a*) Disconnect fuel line from tee at fuel control discharge pressure connection part, (fig. 4-16) and install a 0 to 100 psig pressure gauge.

(*b*) Disconnect control air line at acceleration limiter valve tee.

(*c*) With fuel supplied to fuel control assembly at 15 psig, move master switch (S1) (fig. 2-11), sheet 1 of 2) on power unit instrument panel assembly to START position and motor engine.

CAUTION

Do not exceed starter motor duty cycle.

(*d*) While motoring unit, check cracking pressure. Cracking pressure should be 44 + 1 psig. To adjust, hold acceleration limiter valve adjustment screw (fig. 4-16) on fuel control assembly and loosen locknut. Adjust screw position using screwdriver and wrench assembly (special tools). To increase cracking pressure turn acceleration limiter valve adjustment screw clockwise. To decrease pressure, turn adjustment screw counterclockwise.

CAUTION

Do not turn adjustment screw more than three full turns in either direction.

(*e*) When satisfactory cracking pressure is attained, tighten locknut.

(*f*) Reconnect control air pressure line to acceleration limiter valve. Remove gauge from tee on fuel control assembly, reconnect fuel line, disconnect and remove gas turbine engine analyzer.

(2) Check fuel control governor speed setting as follows:

(*a*) Connect gas turbine engine analyzer to power unit as described in paragraph 4-14b. Use tach-generator rpm gauge (fig. 4-14) on analyzer panel to check engine speed.

(*b*) Start engine (fig. 2-11) and accelerate to no load governed speed. Operate at this speed for approximately two minutes to stabilize operation.

(*c*) Apply full load to engine. To apply load, open compressed air outlet as described in fig. 2-18 and operate cooled air system as described in fig. 2-15.

(*d*) With engine operating at full load, tach-generator rpm gauge (fig. 4-14) should read 4150 + 10 rpm (equal to an engine speec of 40,700 + 100 rpm).

(*e*) If tach-generator rpm gauge does not read 4150 + 10 rpm use screwdriver and wrench assembly (special tools) to adjust full load governed speed.

(*f*) Hold governor adjustment screw (fig. 4-16) on fuel control assembly and loosen locknut. Turn governor adjustment screw clockwise to increase full load governed speed, and counterclockwise to decrease full load governed speed. When adjustment is satisfactory, tighten locknut.

CAUTION

Do not turn screw more than three turns in either direction.

(*g*) Close compressed air outlet as described in fig. 2-18, shut off cooled air system as described in fig. 2-15, and return the engine to no load governed speed.

(*h*) Tach-generator rpm gauge (fig. 4-14) should read 4242 rpm (maximum) (equal to an engine speed of 41,600 rpm).

(*i*) If tach-generator rpm gauge does not read 4242 rpm (maximum), use screwdriver and wrench assembly (special tools) to adjust no load governed speed setting.

(*j*) Hold governor adjustment screw (fig. 4-16) on fuel control assembly and loosen locknut. Turn adjustment screw clockwise to increase no load governed turn adjustment screw counterclockwise to decrease no load governed speed.

(*k*) When adjustment is satisfactory, tighten locknut, disconnect and remove gas turbine engine analyzer.

4-77. Fuel Control Unit Filter

a. Removal. Without removing the fuel control unit from the engine, unscrew filter cap as shown in figure 4-45 and remove and discard filter element and packings.

b. Cleaning and Inspection.

(1) Wash filter cap with an approved cleaning solvent and dry thoroughly with filtered compressed air.

(2) Visually inspect filter cap for cracks, corrosion, damaged threads or other signs of obvious damage. Replace filter cap if found to be damaged.

c. Installation. Install replacement filter element and new packings in reverse order of removal. Tighten filter cap securely but do not overtorque.

4-78. Engine Fuel Filter Element

a. Removal. Without removing the engine fuel filter assembly (fig. 4-44) from power unit, unscrew filter case from filter assembly as shown in figure 4-45. Remove and discard filter element, packing and gasket.

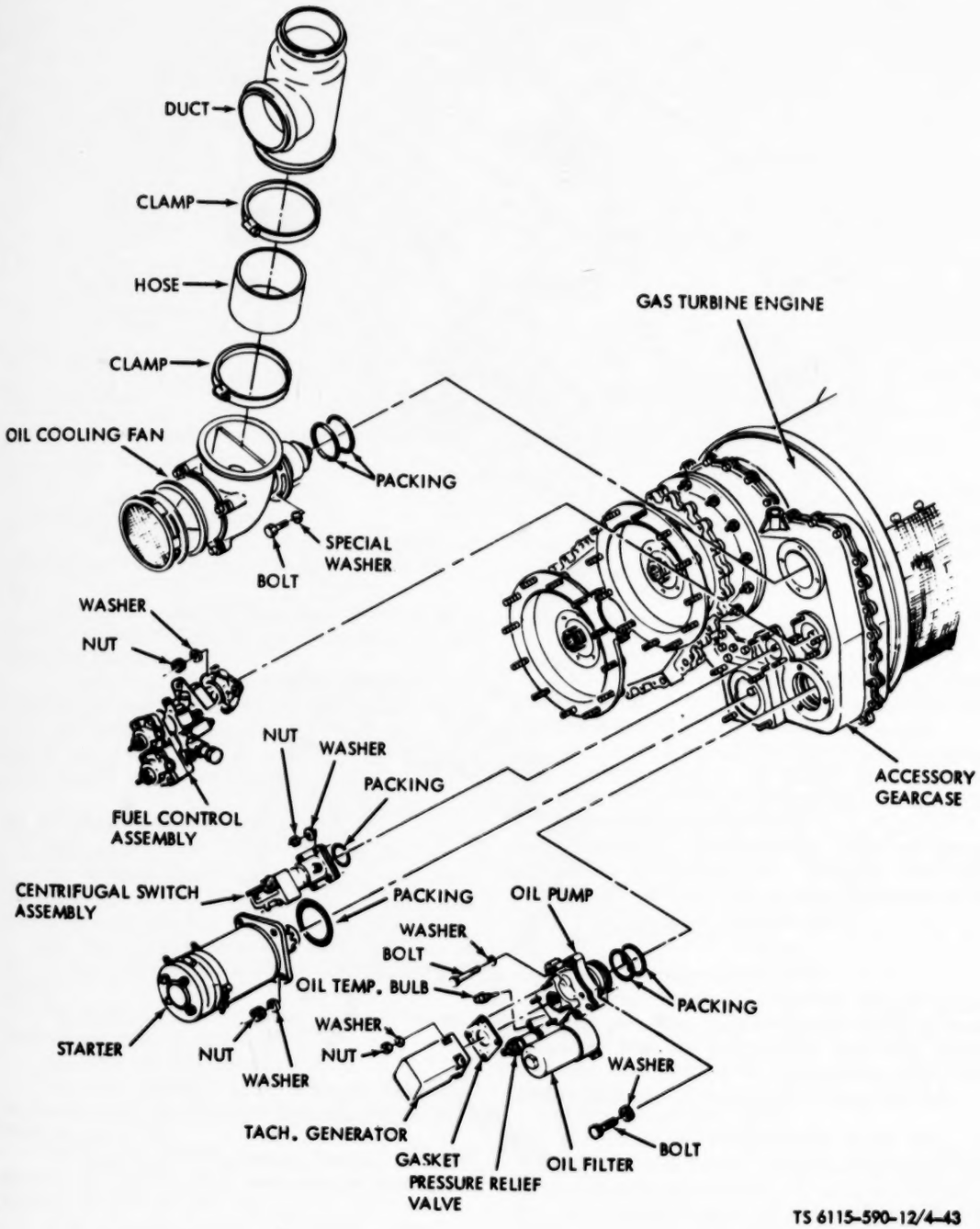


Figure 4-43. Engine Accessory Components Orientation (TS 6115-590-12/4-43).

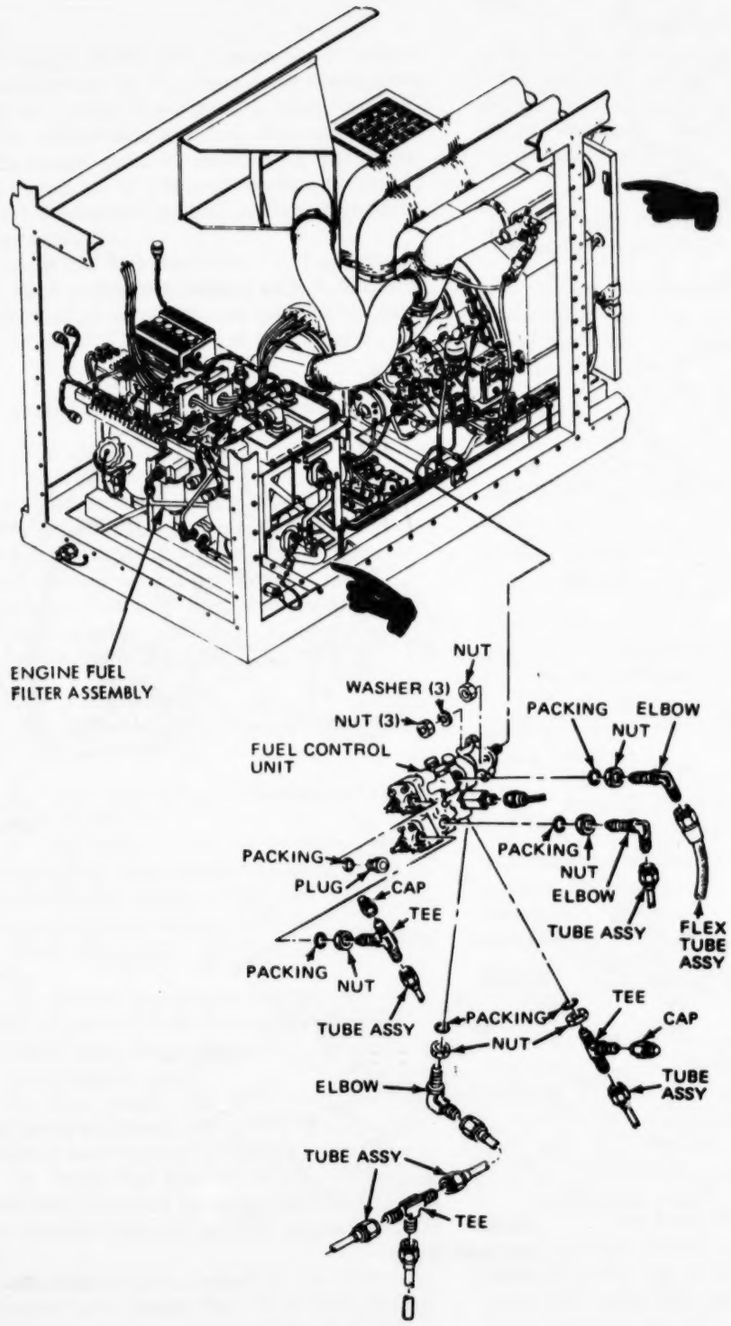


Figure 4-44. Fuel Control Unit Replacement (TS 6115-590-12/4-44).

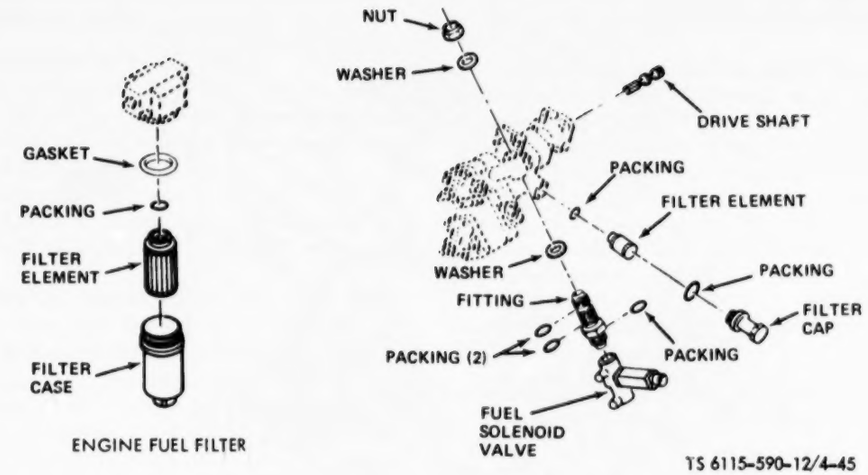


Figure 4-45. Engine Fuel Filter, Fuel Solenoid Valve and Fuel Control Unit Filter Replacement. (*TS 6115-590-12/4-45*).

b. Cleaning and Inspection.

(1) Wash parts with an approved cleaning solvent and dry thoroughly with filtered compressed air.

(2) Visually inspect filter case for corrosion, cracks, damaged threads or evidence of other obvious damage.

c. Installation. Dip replacement filter element in oil (Military Specification MIL-O-6081 grade 1005 or 1010) and install filter element with new packing and gasket in reverse order of removal. Tighten filter case securely but do not overtorque.

4-79. Fuel Solenoid Valve

a. Removal.

(1) Without removing fuel control unit from the engine, disconnect wiring harness connector and tube assembly from fuel solenoid valve (fig. 4-45).

(2) Remove nut and washer securing fitting to fuel control unit; remove solenoid valve, fitting and washer.

(3) Remove fitting from solenoid valve. Remove and discard packings.

b. Cleaning and Inspection.

(1) Wipe solenoid valve with a clean rag moistened with an approved cleaning solvent and allow to dry.

(2) Inspect valve for cracks, breaks, or other damage. Inspect electrical connector for bent pins, stripped threads or other damage.

c. Test. Connect a 24V DC power source to terminals A and B of the solenoid coil. If solenoid does not actuate when power is applied, replace solenoid valve.

d. Installation. Install satisfactory or replacement fuel solenoid valve in reverse order of removal using new packings.

4-80. Oil Pump Assembly

a. Removal.

(1) Remove all tube assemblies from oil pump assembly (fig. 4-46) and wiring harness connectors from tach-generator and oil temperature bulb.

(2) Remove three attaching bolts and washers and carefully remove oil pump assembly and packings, with attached components from engine in a straight line. Discard packing.

(3) Remove tach-generator from oil pump assembly by removing four attaching nuts and washers. Reconnect wiring harness connectors to oil temperature bulb and tach-generator.

4-81. Oil Temperature Bulb

a. Removal. Without removing the oil pump assembly from the engine, remove wiring harness connector from oil temperature bulb (fig. 4-46). Unscrew and remove oil temperature bulb and gasket from oil pump assembly. Discard gasket.

b. Cleaning and Inspection.

(1) Clean oil temperature bulb with an approved cleaning solvent and dry thoroughly with filtered compressed air.

(2) Visually inspect oil temperature bulb for cracks, corrosion, abrasion, damaged threads, or other evidence of damage.

c. Installation. Install satisfactory or replacement oil temperature bulb on oil pump assembly

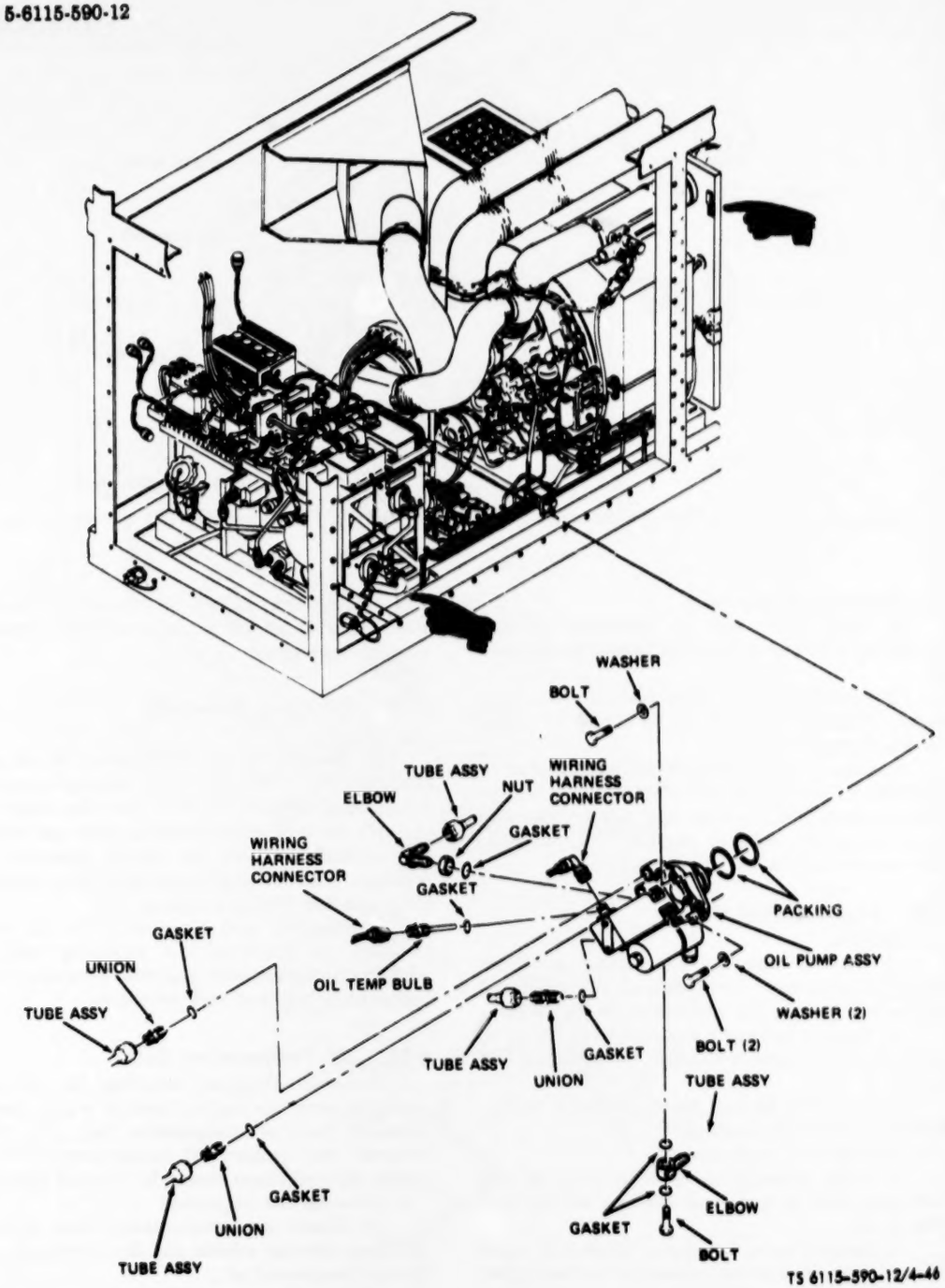


Figure 4-46. Oil Pump Replacement (TS 6115-590-12/4-46).

using new gasket. Tighten securely and reconnect wiring harness connector.

4-82. Oil Pump Filter Element

a. Removal. Unscrew filter case (fig. 4-47) from oil pump assembly without removing pump assembly from engine. Remove and discard filter element and packings.

b. Cleaning and Inspection.

(1) Clean filter case with an approved cleaning solvent and dry thoroughly with filtered compressed air.

(2) Visually inspect filter case for cracks, corrosion, damaged threads or other obvious damage. Replace damaged filter case.

c. Installation. Dip new replacement filter element in oil of the same specification and brand being used in engine lubrication system. Install small packing included with filter element in place inside neck of filter element. Install new filter element with new packing into case. Install case with new element on oil pump assembly. Tighten case securely, but do not overtorque case.

4-83. Pressure Relief Valve

a. Removal. Without removing oil pump assembly from engine, unscrew pressure relief valve (fig. 4-47) from oil pump assembly. Remove valve assembly and packings.

b. Cleaning and Inspection.

(1) Clean pressure relief valve with an approved cleaning solvent and dry thoroughly with filtered compressed air.

(2) Visually inspect valve assembly for cracks, corrosion, abrasion, damaged threads or other evidence of damage.

c. Installation. Install satisfactory or replacement pressure relief valve in oil pump assembly using new packing.

d. Adjustment. Check operation of valve assembly during engine operation. Oil pressure shall be 90 + 10 psig. Adjust pressure by loosening locknut and turning adjustment screw as required. Refer to paragraph 4-14 for instructions on connecting engine analyzer to engine.

4-84. Tachometer Generator

a. Removal.

(1) Without removing tach-generator (fig. 4-47) from engine, detach wiring harness connector from tach-generator.

(2) Remove four attaching nuts and washers and carefully remove tach-generator from oil pump assembly. Remove and discard gasket.

b. Cleaning and Inspection.

(1) Remove all dust, dirt and foreign matter from tach-generator with filtered compressed air. Clean tach-generator with a clean rag moistened with an approved cleaning solvent and dry thoroughly.

(2) Inspect electrical connector for damage. If connector is damaged beyond repair replace the tachometer generator.

(3) Functionally inspect tach-generator in accordance with Military Specification MIL-G-6027. If it fails to meet functional inspection requirements, replace the tach-generator.

c. Installation. Install satisfactory or replacement tachometer generator on oil pump assembly using a new gasket. Secure with attaching washers and nuts. Tighten nuts securely and reconnect wiring harness connector.

4-85. Low Oil Pressure Switch

a. Removal. Remove tube assembly and wiring harness connector from low oil pressure switch (fig. 4-48). Remove two attaching bolts and washers and remove switch from engine.

b. Cleaning and Inspection.

(1) Clean switch with a clean rag moistened with an approved cleaning solvent.

(2) Visually inspect switch for cracks, damaged threads or other evidence of damage.

c. Test.

(1) Check the continuity across receptacle pins. Circuit across pins A and B should be closed; circuit across pins B and C should be open.

(2) Place switch in a suitable holding device. Slowly apply filtered, regulated compressed air to switch inlet port.

(3) Check continuity across receptacle pins while applying air pressure. Before 45 psig air pressure is reached, the circuit across pins A and B should be open and circuit across pins B and C should close.

(4) Slowly decrease air pressure. At 37 + 3 psig air pressure, circuit across pins A and B should close; circuit across pins B and C should open.

(5) Disconnect air supply and remove switch from holding device.

d. Installation.

(1) Install replacement or satisfactory switch in place and secure with attaching washers and bolts. Tighten bolts to 20 to 25 inch-pound torque.

(2) Reconnect tube assembly and wiring harness connector to switch.

4-86. Centrifugal Multi-Speed Switch Assembly

a. Removal. Disconnect wiring harness connector from switch assembly (fig. 4-41). Remove four attaching nuts and washers and carefully remove switch assembly and packing from engine in a straight line. Discard packing.

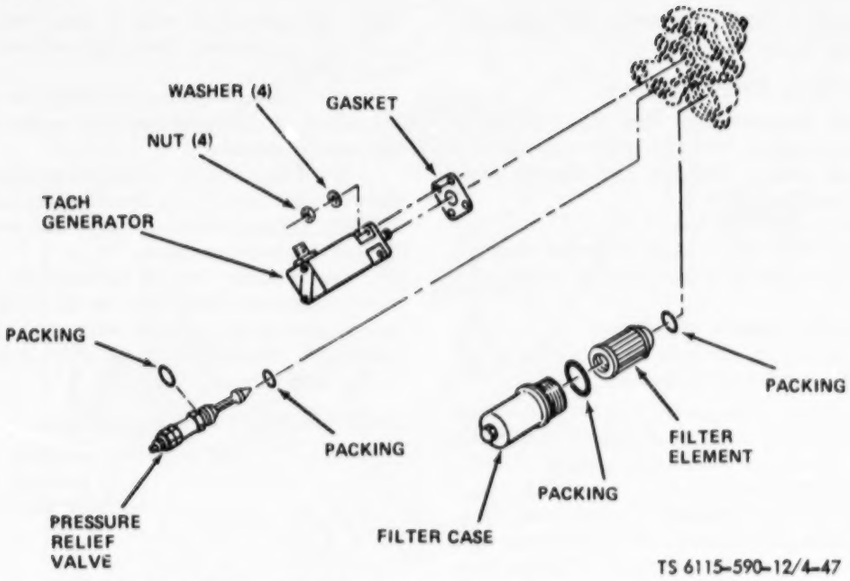


Figure 4-47. Tach-Generator, Relief Valve and Oil Filter Replacement. (TS 6115-590-12/4-47).

b. Installation.

(1) Install replacement switch assembly on engine using new packing. Secure switch assembly to engine with attaching washers and nuts. Tighten nuts securely.

(2) Reconnect wiring harness connector to switch assembly.

c. Adjustment. Refer to paragraph 4-14e (6) for adjustment procedures for the switch assembly.

4-87. Acceleration Control Thermostat

a. Removal.

(1) Hold flats on thermostat valve (fig. 4-49) with a wrench and remove tube assembly.

(2) Remove one attaching bolt and washer, retainer plate and shim washers. Remove thermostat from turbine plenum flange.

(3) Remove thermostat valve and packing from thermostat body.

b. Installation.

(1) Install satisfactory or replacement valve in thermostat body. Tighten valve securely.

(2) Install replacement thermostat in plenum flange with side stamped "AFT" facing toward rear or downstream.

(3) Install washers (shims) as required for an 0.010 to 0.020 inch pinch between retainer plate and mounting boss, then install retainer plate.

(4) Coat threads of attaching bolt with a film of compound (Fel-Pro C-5), then install washer and coated bolt. Tighten bolt to 50 to 70 inch-pound torque.

(5) Hold flats on thermostat valve with a wrench and connect tube assembly. Tighten tube assembly to 150 inch-pounds torque.

(6) Check controlling temperature and adjust as required in accordance with paragraph 4-14e (1).

4-88. Plenum Drain Valve

a. Removal. Remove tube assembly, then remove drain valve (fig. 4-49) and packing from turbine plenum.

b. Installation. Install replacement drain valve in turbine plenum with new packing. Install valve with arrow pointing down. Tighten valve securely then reconnect tube assembly.

4-89. Electrical Engine Starter

a. Removal.

(1) Tag and remove wiring harness leads from starter terminal.

(2) Remove four attaching nuts and washers and carefully remove starter and packing (fig. 4-43) in a straight line from the engine. Discard packing.

b. Installation.

(1) Install replacement starter on engine using new packing. Use care to avoid damage to starter pawls and engine jaw.

(2) Secure starter assembly with attaching washers and nuts. Tighten nuts securely. Reconnect wiring harness leads to starter terminals.

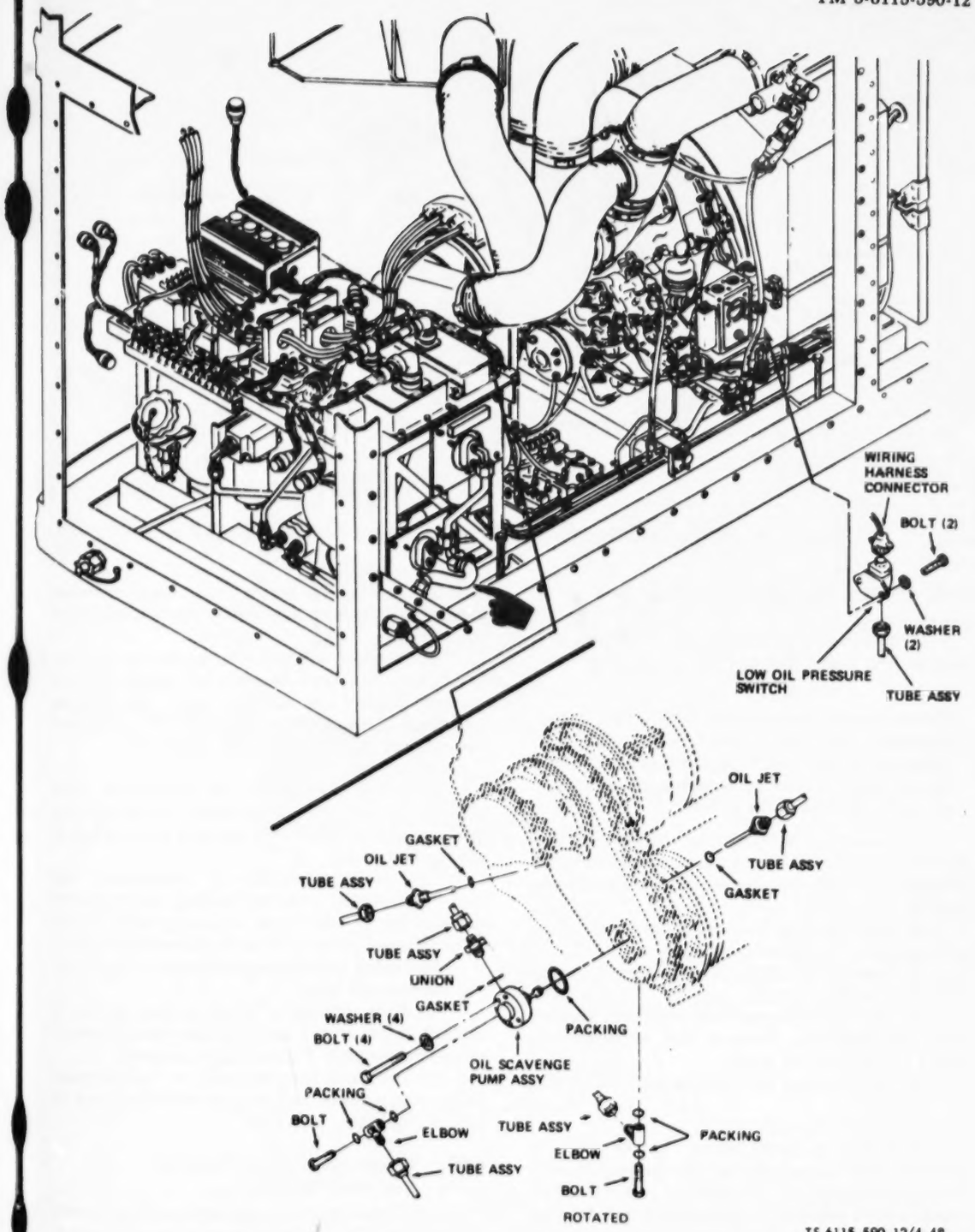


Figure 4-48. Lubrication System Component Replacement. (TS 6115-590-12/4-48).

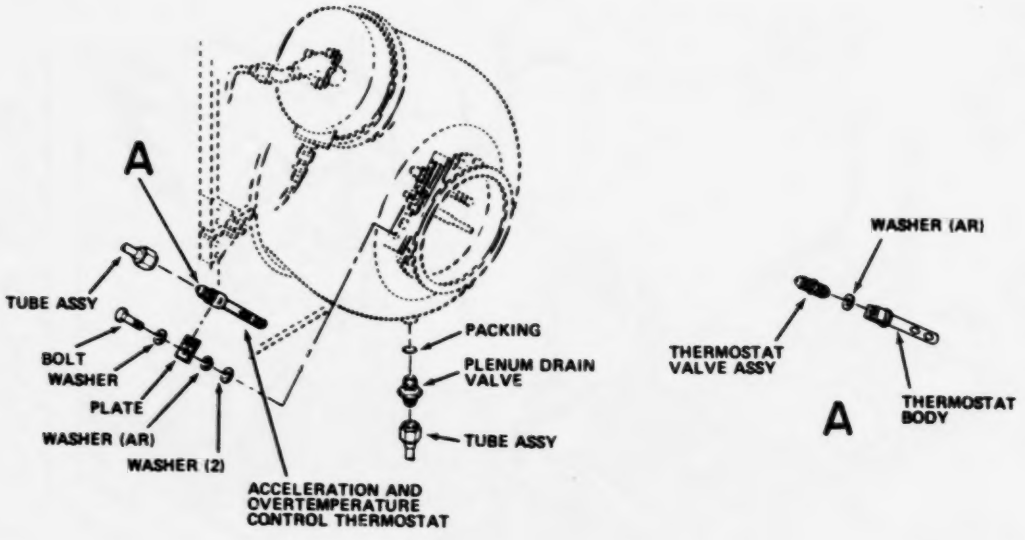


Figure 4-49. Acceleration Control Thermostat and Plenum Drain Valve. (TS 6115-590-12/4-49).

4-90. Fuel Combustion Chamber

a. Removal.

(1) Remove tube assembly (fig. 4-50) from fuel atomizer and electrical lead from igniter plug.

WARNING

Do not remove igniter plug until it has been grounded. The high tension lead must be grounded as soon as it is removed from the igniter plug. Ground by touching the contact spring in the lead to the igniter.

(2) Loosen screw in coupling and remove combustion chamber liner, coupling, combustor cap assembly and fuel atomizer assembly from turbine plenum.

(3) Slide coupling over end of combustion liner and remove from engine.

(4) Remove igniter plug by removing attaching bolts and washers.

(5) Remove three attaching bolts and washers from fuel atomizer. Remove fuel atomizer and packing from combustor cap.

(6) Remove liner and packing from combustor cap.

b. Cleaning and Inspection.

(1) Wash all parts except igniter plug in approved cleaning solvent and dry thoroughly with filtered compressed air. If necessary, remove carbon deposits from atomizer nozzle using a soft bristled fiber brush while directing filtered compressed air at approximately 20 psig pressure into atomizer fuel inlet port. Do not use a wire brush. Clean excessive carbon deposits from liner with a wooden scraper or equivalent.

(2) Inspect all metallic parts for cracks, corrosion, damaged threads or other obvious damage. Inspect fuel atomizer screen for clogging and breaks. Inspect liner assembly for cracks and deformation in accordance with figure 4-51.

c. Installation.

(1) Install satisfactory or replacement liner assembly into combustor cap being careful that the igniter plug hole in the liner matches up with hole in the combustor cap.

(2) Install satisfactory or replacement fuel atomizer assembly with new packing on combustor cap and secure with three attaching washers and bolts. Tighten bolts to 20 to 25 inch-pound torque.

(3) Install igniter plug and secure with attaching washers and bolts.

(4) Slide coupling over end of liner and on to combustor cap. Install cap with liner turbine plenum using new packing. Tighten clamp securely.

(5) Reconnect tube assembly to fuel atomizer using new packing and connect electrical lead to igniter plug.

4-91. Upper and Lower Plenums and Heat Shields

Inspect upper and lower plenums and heat shields for dents, cracks, corrosion, loose or missing mounting hardware or other obvious damage.

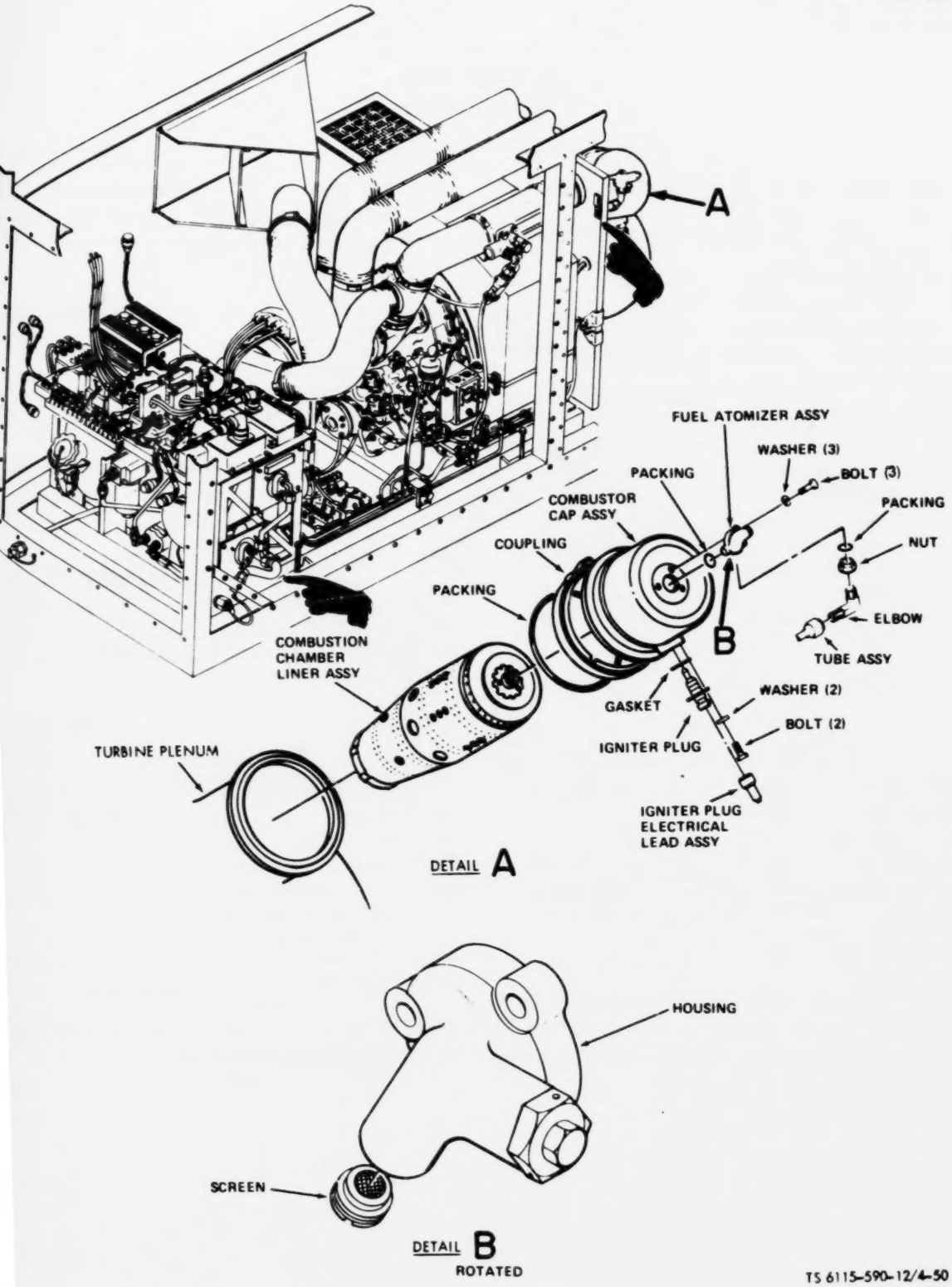
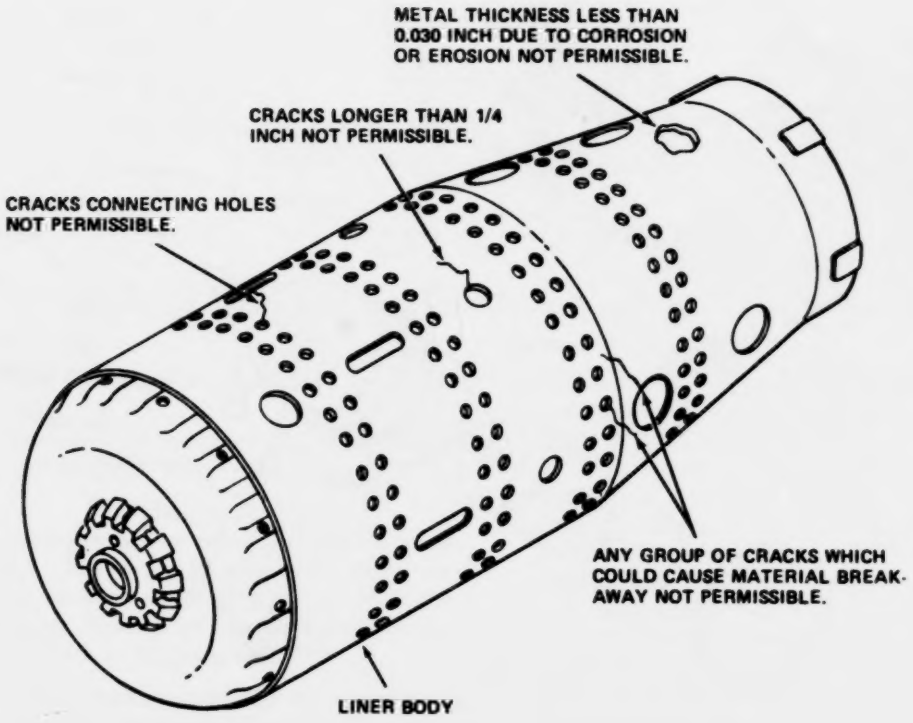


Figure 4-50. Fuel Combustion Chamber Component Replacement. (TS 6115-590-12 4-50).



TS 6115-590-12/4-51

Figure 4-51. Inspection of Combustion Chamber Liner Assembly. (TS 6115-590-12/4-51).

APPENDIX A
REFERENCES

A-1. Fire Protection

TM5-4200-200-10	Hand Portable Fire Extinguishers Approved for Army Users.

A-2. Lubrication

C9100-IL	Identification List for Fuels, Lubricants, Oils and Waxes.
LO5-6115-590-12	Lubrication Order

A-3. Radio Suppression

TM 11-483	Radio Interference Suppression.

A-4. Maintenance

TM38-750	Army Maintenance Management System.
TB5-6115-434-30/1	Maintenance Program for Utility Element Type A MUST System.
TB43-0002-32	Maintenance Expenditure Limits for FSC Group 61, FSC Classes 6115 through 6120, 6125, and 6130.
TM5-4130-234-13&P	Operator, Organizational and Direct Support (Including Repair Parts and Special Tools List) Service Unit, Refrigeration System (MUST).
TM5-6115-590-12	Operator and Organizational Maintenance Manual.
TM5-6115-590-20P	Organizational Maintenance Repair Parts and Special Tools List.
TM5-6100-224-ESC	Equipment Serviceability Criteria.
TM5-4330-230-12	Operator and Organizational Maintenance Manual Including Repair Parts and Special Tools List, Filter/Separator.
TM5-4920-200-15	Operator, Organizational, Field and Depot Maintenance Manual, Engine Analyzer, Gas Turbine.
TM9-6140-200-15	Operation, Organizational, Field and Depot Maintenance, Storage Batteries, Lead Acid Type.
TM9-2330-275-14	Operator, Organizational, Direct Support and General Support Maintenance Manual, Transporter.

A-5. Painting

TM43-0139	Painting Instructions for Field Use

A-6. Shipment and Storage

TB 740-93-2	Preservation of USAMEC Mechanical Equipment for Shipment and Storage
TM 740-90-1	Administrative Storage of Equipment
TM 38-230	Preservation, Packaging and Packing of Military Supplies and Equipment.

A-7. Material Destruction

TM 750-244-3	Destruction of Army Material to Prevent Enemy Use.

APPENDIX B
COMPONENTS OF END ITEMS LIST

Section I. Introduction

B-1. Scope

This appendix lists integral components of and basic issue items for the power plant to help you inventory items required for safe and efficient operation.

B-2. General

The Components of End Items List is divided into the following sections:

a. Section II. Integral Components of the End Item. These items, when assembled, comprise the power plant and must accompany it whenever it is transferred or turned in. These illustrations will help you identify these items.

b. Section III. Basic Issue Items. These are minimum essential items required to place the power plant in operation, to operate it, and to perform emergency repairs. Although shipped separately packed they must accompany the power plant during operation and whenever it is transferred between accountable officers. The illustrations will assist you with hard-to-identify items. This manual is your authority to requisition replacement BII, based on Table(s) of Organization and Equipment (TOE)/ Modification Table of Organization and Equipment (MTOE) authorization of the end item.

B-3. Explanation of Columns

a. Illustration. This column is divided as follows:

(1) *Figure Number.* Indicates the figure number of the illustration on which the item is shown (if applicable).

(2) *Item Number.* The number used to identify item called out in the illustration.

b. National Stock Number (NSN). Indicates the National stock number assigned to the item and which will be used for requisitioning.

c. Part Number (P/N). Indicates the primary number used by the manufacturer, which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

d. Description. Indicates the Federal item name and, if required, a minimum description to identify the item.

e. Location. The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of the major item before moving on to an adjacent area.

f. Usable on Code. "USABLE ON" codes are included to help you identify which component items are used on the different models. Identification of the codes used in these lists are:

Code	Used On
None	None

g. Quantity Required (Qty Reqd). This column lists the quantity of each item required for a complete major item.

h. Quantity. This column is left blank for use during inventory. Under the Rcvtd column, list the quantity you actually receive on your major item. The Date columns are for use when you inventory the major item at a later date; such as for shipment to another site.

Section II
Integral Components of End Items

(1) Illustration (a) Figure No.	(1) Illustration (b) Item No.	(2) National Stock Number	(3) Part No. & FSCM	(4) Description	(5) Location	(6) Usable on Code	(7) Qty Reqd	(8) Quantity Rev'd	(8) Quantity Date	(8) Quantity Date	(8) Quantity Date
1-15	4	6115-00-859-2346	(97403)13217E4000	Cable Assy, Remote Power	Refrig Comp		1				
1-15	2	6115-00-859-2352	(97403)13217E3965	Cable Power, Elec DC	Batt Comp		1				
1-15	1	6115-00-843-8612	(97403)13217E3964	Cable Power, Elec Bat	Batt Comp		1				
1-15	3	6115-00-871-6709	(97403)13217E3971	Cable Pwr, Elec Standby	Batt Comp		1				
1-15	5	6150-00-863-8595	(97403)13217E3982	Cable Power, Elec 400 HZ	Refrig Comp		1				
1-15	6	6150-00-467-2541	(97403)13217E3983	Cable Power, Elec 60 HZ	Refrig Comp		1				
1-15	12	5340-00-886-5744	(97403)13217E3959	Clamp, Coupling	Cond Comp		4				
1-15	11	4130-00-863-8636	(97403)13217E4038	Duct Assy	*		8				
4-9			(97403)13220E2802	Retainer, Duct	Cond Comp		2				
1-15	10		(97403)13220E8950	Ejector	Batt Comp		1				
1-15	15	4330-00-438-1460	(97403)13217E6620	Filter/Separater	Refrig Comp		1				
1-15	18	4720-00-929-6396	(97403)13220E4450	Hose Fuel	Refrig Comp		1				
1-15	17		(97403)13220E8039	Hose Fuel	Refrig Comp		1				
1-15	16		(97403)13220E8041	Hose Fuel	Refrig Comp		1				
1-15	14	4720-00-574-7902	(97403)13217E3962	Hose, Vacuum	Batt Comp		1				
1-15	7	4720-01-010-4442	(97403)13220E2740	Hose, Compressed Air	Batt Comp		1				
1-15	8	4720-00-003-0960	(97403)13217E4033	Hose, Water Supply	Refrig Comp		1				
1-15	19	4720-00-003-0981	(97403)13218E8816	Hose, Water Recirc	Batt Comp		1				
1-15	9	4720-00-003-0979	(97403)13217E4059	Hose, Dual Water	Evap Comp		1				
1-15	13		(97403)13217E4106	Partition, Evaporator	Batt Comp		1				
4-7			(97403)13220E2801	Retainer, Duct	Evap Comp		1				
1-15	21	5975-00-878-3791	(81349)MIL-R-11461	Rod, Ground	Eng Comp		1				
1-15	7		(97403)13220E8065	Hose, Anti-Icing	Batt Comp		1				
1-15	20	5935-00-791-2302	(97403)13217E3807-2	Connector, Receptacle	Elect Panel		1				

*Cond, Air outlet and Battery Comp.

Section III
Basic Issue Items

(1) Illustration (a) Figure No.	(1) Illustration (b) Item No.	(2) National Stock Number	(3) Part No. & FSCM	(4) Description	(5) Location	(6) Usable on Code	(7) Qty Reqd	(8) Quantity Rev'd	(8) Quantity Date	(8) Quantity Date	(8) Quantity Date
		7520-00-559-9618		Case, Cotton Duck	Refrig Comp		1				
		7510-00-889-3494		Binder, Log Book	Refrig Comp		1				
		4210-00-555-8837		Extinguisher, Fire	Elect Panel		1				

APPENDIX C
ADDITIONAL AUTHORIZATION LIST

Section I. Introduction

C-1. Scope

This appendix lists additional items you are authorized for the support of the power plant.

C-2. General

This list identifies items that do not have to accompany the equipment and that do not have to be turned in with it. These items are authorized to you by CTA, MTOE, TDA or JTA.

C-3. Explanation of Listing

National stock number, descriptions, and questions are provided to help you identify and request the additional items you require to support this equipment. "USABLE ON" codes are identified as follows:

Code	*Used On*
None	None

Section II.
Additional Authorization List

(1) National Stock Number	(2) Description Part Number & FSCM / Usable On Code	(3) U/M	(4) Qty Auth
	To supply fuel to Power Plant from tank, 600 gal(s) (9740313217E7080), the following parts are authorized:		
	96906MS27030-6; Gasket	EA	1
	96906MS27024-12; Coupling	EA	1
	96906MS14315-25YA; Bushing	EA	1
	96906MS51846-81; Nipple	EA	1
	9740313221E6269-4; Valve	EA	1
	9740313220E1061-3; Cap	EA	2
	96906MS20826-8B; Tee	EA	1
	96906MS14315-8XA; Bushing	EA	1
	81349 MIL-T-27730; Tape, Size II, . 50 wide	AR	
	To supply water from a 500 gal(s) collapsible water tank (9740313201E9410) the following parts are authorized:		
	9740313218E0479-35; Adapter	EA	1
	88044AN816-12B; Nipple	EA	2
	96906MS14315-20YA; Bushing	EA	2
	96906MS14305-8UA; Fitting	EA	1
	9740313220E1061-2; Cap	EA	2
	The following misc. fittings are authorized:		
	96909MS51501B8S; Nipple (To connect two (2) lengths of water receiving hose.)	AR	
	88044AN815-12D; Union (To connect two (2) lengths of vacuum hose.)	AR	
	96906MS51501B16S; Nipple (To connect two (2) lengths of bleed air hose.)	AR	
4240-00-022-2946	Protector, Aural	EA	2
5120-01-013-1676	Ground Rod Remover	EA	1
5120-00-240-5328	Wrench Adjustable 12 Inch	EA	1

APPENDIX D
MAINTENANCE ALLOCATION CHART

Section 1. Introduction

D-1. General

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component and the work measurement time required to perform the functions by the designated maintenance level. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III lists the tools and test equipment required for each maintenance function as referenced from Section II.

D-2. Explanation of Columns in Section II

a. Column (1), Group Number. Column 1 lists group numbers to identify related components, assemblies, sub-assemblies, and modules with their next higher assembly. The applicable groups are listed in the MAC in disassembly sequence beginning with the first group removed.

b. Column (2), Component/Assembly. This column contains the noun names of components, assemblies, sub-assemblies and modules for which maintenance is authorized.

c. Column (3), Maintenance Functions. This column lists the functions to be performed on the item listed in Column 2. The maintenance functions are defined as follows:

(1) *Inspect.* To determine serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

(2) *Test.* To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

(3) *Service.* Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

(4) *Adjust.* To maintain within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to be specified parameters.

(5) *Align.* To adjust specified variable elements of an item to bring about optimum or described performance.

(6) *Calibrate.* To determine and cause corrections to be made or to be adjusted on instruments to test measuring and diagnostic equipments used in precision measurement. Consist of comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

(7) *Install.* The act of emplacing, seating, or fixing into position an item, part or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

(8) *Replace.* The act of substituting a serviceable like type part, sub-assembly, or module (component or assembly) for an unserviceable counterpart.

(9) *Repair.* The application of maintenance services (inspect, test, service, adjust, align, calibrate, or replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, sub-assembly, module (component or assembly), end item, or system.

(10) *Overhaul.* That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standard (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

(11) *Rebuild.* Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying army equipment/components.

d. Column (4), Maintenance Category. This column is made up of sub-columns for each category of maintenance. Work time figures are listed in these sub-columns for the lowest level of maintenance authorized to perform the function listed in column 3. These figures indicate the average active time required to perform the maintenance function at the indicated category of maintenance under typical field operating conditions.

e. Column (5), Tools and Equipment. This column is provided for referencing by code, the common tool sets (not individual tools) special tools, test and support equipment required to perform the designated function.

D-3. Explanation of Columns in Section III

a. Column (1), Reference Code. This column consists of an arabic number listed in sequence from Column 5 of Section II. The number references the common tool sets, special tools and test equipment requirements.

b. Column (2), Maintenance Category. This column shows the lowest category of maintenance authorized to use the special tools or test equipment.

c. Column (3), Nomenclature. This column lists the name or identification of the common tool sets, special tools or test equipment.

d. Column (4), National/Nato Stock No. (NSN). This column is provided for the NSN of common tool sets, special tools and test equipment listed in the nomenclature column.

e. Column (5), Tool Number. This column lists the manufacturer's code and part number of tools and test equipment.

Section II. Maintenance Allocation Chart For Power Plant, Utility (Must) NSN 6115-00-937-0929

(1)	(2)	(3)	(4)					(5)
Group Number	Component/Assembly	Maintenance Function	Maintenance Category					Tools and Equipment
			C	O	F	H	D	
01	POWER PLANT ACCESSORY COMPONENTS							
0101	Hose Assembly, Hot and Cold Water	Inspect	0.2					
		Replace		0.2				
		Repair			0.5			
0102	Hose, Water Supply and Drain	Inspect	0.2					
		Replace		0.2				
		Repair			0.5			
0103	Power Cable Assemblies, 60 and 400 Hz	Inspect		0.2				
		Replace		0.5				
		Repair				2.0		
		Overhaul					2.5	
		Rebuild					3.5	
0104	External Fuel Filter/Separator and Hose Assemblies	Inspect	0.3					
		Service	1.0					
		Replace		0.5				
		Repair		1.5				
0105	400 HZ Remote Power Cable Assembly	Inspect		0.2				
		Test		0.3				
		Replace		0.2				
		Repair			0.5			
		Overhaul					1.5	
0106	DC Electrical Power Standby Cable Assembly	Inspect		0.2				
		Test		0.2				
		Replace		0.2				
		Repair			0.5			
		Overhaul					1.0	
0107	External DC Electrical Power Input Cable Assembly	Inspect		0.2				
		Test		0.3				
		Replace		0.2				
		Repair			0.5			
		Overhaul					1.0	
0108	External Battery DC Power Cable Assembly	Inspect		0.2				
		Test		0.3				
		Replace		0.3				
		Repair			0.5			
		Overhaul					1.0	
0109	Water Recirculating Hose Assembly	Inspect	0.2					
		Test			1.0			
		Replace		0.2				
		Repair			1.0			
0110	Vacuum Hose Assembly	Inspect		0.2				
		Replace		0.2				
		Repair			1.0			

Subcolumns are as follows: C—Operator/Crew O—Organizational F—Direct Support H—General Support D—Depot

(1)	(2)	(3)	(4)					(5)
Group Number	Component/Assembly	Maintenance Function	Maintenance Category					Tools and Equipment
			C	O	F	H	D	
0111	Compressed Air Hose Assembly	Inspect		0.2				
		Replace		0.2				
		Repair			1.0			
0112	Anti Icing Hose Assembly	Inspect		0.2				
		Replace		0.2				
		Repair			1.0			
02	INFLATION EJECTOR ASSEMBLY	Inspect		0.2				
0201	Ejector, Inflation Air	Replace		0.8				
		Repair			1.5			
03	CONDENSER FAN ASSEMBLY	Inspect		0.2				
0301	Fans, Condenser	Replace		2.0				
		Repair			4.0			1 thru 8
		Overhaul				5.0		
		Rebuild					8.0	
04	RECIRCULATING FAN ASSEMBLY	Inspect		0.2				
0401	Fans, Recirculating	Replace		2.0				1 thru 4
		Repair			4.0			9 thru 13
		Overhaul				5.0		
		Rebuild					8.0	
05	INSTRUMENT PANEL ASSEMBLY							
0501	Panel Assembly	Inspect		1.0				
		Repair		6.0				
		Overhaul					16.0	
		Rebuild					20.0	
0502	Harness, Electrical	Inspect		0.3				
		Test		0.8				
		Replace		3.0				
		Repair			4.0			
		Overhaul					5.0	
		Rebuild					7.0	
06	AIR CONDITIONING PANEL ASSEMBLY							
0601	Panel, Assembly	Inspect		0.3				
		Test		0.8				
		Repair		2.0				
		Overhaul					3.5	
		Rebuild					4.5	
0602	Harness, Electrical	Inspect		0.3				
		Test			0.8			
		Replace		3.0				
		Repair			4.0			
		Rebuild					6.0	
0603	DC Power Wire Harness	Inspect	0.2					
		Test		0.3				
		Replace			1.0			
		Rebuild					3.0	

Subcolumns are as follows: C—Operator/Crew O—Organizational F—Direct Support H—General Support D—Depot

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Category C	O	F	H	D	(5) Tools and Equipment
0604	Compressor Wire Harness	Inspect	0.2					
		Test		0.3				
		Replace		0.5				
		Repair			1.0			
		Rebuild					2.5	
0605	Compressor Wire Harness	Inspect	0.2					
		Test		0.3				
		Replace		0.5				
		Repair			1.0			
		Rebuild					2.5	
0606	Remote Fans Wire Harness	Inspect	0.2					
		Test		0.3				
		Replace		0.5				
		Repair			1.0			
		Rebuild					2.5	
0607	Condenser Fans Wire Harness	Inspect	0.2					
		Test		0.3				
		Replace		0.5				
		Repair			1.5			
		Rebuild					2.5	
0608	Recirculating Fans Wire Harness	Inspect	0.2					
		Test		0.3				
		Replace		0.5				
		Repair			1.5			
		Rebuild					2.5	
0609	Remote Power Wire Harness	Inspect	0.2					
		Test		0.3				
		Replace		0.5				
		Repair			1.5			
		Rebuild					2.5	
0610	Air Conditioning Panel Wire Harness	Inspect	0.3					
		Test		0.5				
		Replace		1.0				
		Repair			1.5			
		Rebuild					2.5	
07	AUXILIARY POWER TRAY ASSY.							
0701	Tray Assembly	Inspect		0.2				
		Test		0.6				
		Replace			1.0			
		Repair		2.0				
		Overhaul					2.0	
		Rebuild					3.0	
0702	Harness, Electrical	Inspect		0.3				
		Test		0.8				
		Replace		3.0				
		Repair			3.0			
		Overhaul					3.5	
		Rebuild					4.0	

Subcolumns are as follows: C—Operator/Crew O—Organizational F—Direct Support H—General Support D—Depot

(1)	(2)	(3)	(4)					(5)
Group Number	Component/Assembly	Maintenance Function	Maintenance Category					Tools and Equipment
			C	O	F	H	D	
0703	400 HZ Aux. Output No. 1 Wire Harness	Inspect		0.3				
		Test		0.3				
		Replace		1.5				
		Repair			3.0			
		Overhaul					3.5	
0704	400 HZ Aux. Output No. 2 Wire Harness	Inspect		0.3				
		Test		0.3				
		Replace		1.5				
		Repair			3.0			
		Overhaul					3.5	
08	RECEPTACLE PANEL ASSEMBLY							
0801	Panel Assembly	Inspect		0.5				
		Repair		2.0				
		Overhaul					3.0	
		Rebuild					4.5	
0802	Harness, Electrical	Inspect		0.3				
		Test		0.8				
		Replace		1.0				
		Repair			2.0			
		Overhaul					3.0	
		Rebuild					4.5	
0803	Water Line Heater Wire Harness	Inspect	0.2					
		Test		0.4				
		Replace		0.5				
		Repair		1.0				
		Rebuild					2.5	
0804	60 Hz Output Wire Harness, Upper	Inspect	0.3					
		Test		0.5				
		Replace		1.0				
		Repair		1.0				
		Rebuild					2.0	
0805	400 HZ Output Wire Harness, Upper	Inspect	0.3					
		Test		0.5				
		Replace		1.0				
		Repair			1.0			
		Rebuild					2.0	
0806	400 HZ Output Wire Harness, Lower	Inspect	0.3					
		Test		0.5				
		Replace		1.0				
		Repair			1.0			
		Rebuild					2.0	
0807	DC Standby Wire Harness	Inspect	0.3					
		Test		0.5				
		Replace		1.0				
		Repair			1.5			
		Rebuild					2.0	
0808	Slave Receptacle Cable Assembly	Inspect	0.3					
		Test		0.5				
		Replace		1.0				
		Repair			1.5			
		Rebuild					2.0	

Subcolumns are as follows: C—Operator/Crew O—Organizational F—Direct Support H—General Support D—Depot

(1)	(2)	(3)	(4)					(5)
Group Number	Component/Assembly	Maintenance Function	Maintenance Category					Tools and Equipment
			C	O	F	H	D	
0809	60 HZ Output Wire Harness, Lower	Inspect	0.3					
		Test		0.5				
		Replace		1.0				
		Repair			1.5			
		Rebuild					2.0	
0810	Receptacle Panel Wire Leads	Inspect	0.4					
		Replace		1.0				
09	A/C & HEAT CONTROL PANEL							
0901	Temperature Control Panel Assembly	Inspect	0.5					
		Repair		5.0				
		Overhaul					8.0	
		Rebuild					9.5	
0902	Harness, Electrical	Inspect		0.5				
		Test		0.8				
		Replace		2.0				
		Repair			3.0			
		Overhaul					3.5	
		Rebuild					4.5	
10	WIRE HARNESSES, ELECTRICAL INSTALLATION							
1001	Harnesses, Interconnecting	Inspect	0.5					
		Test		0.8				
		Replace		1.0				
		Repair			2.0			
		Overhaul					2.5	
		Rebuild					3.5	
1002	400 HZ Auxiliary Wire Harness	Inspect		0.3				
		Test		0.8				
		Replace		1:2				
		Repair			1.5			
		Rebuild					2.0	
1003	Wire Harness, Air Conditioning Power	Inspect		0.3				
		Test		0.8				
		Repair			2.0			
		Rebuild					3.0	
1004	Battery Wire Harness	Inspect		0.3				
		Test		0.5				
		Replace		1.0				
		Repair			1.5			
		Rebuild					2.0	
1005	Remote Power Wire Harness	Inspect		0.3				
		Test		0.8				
		Replace		1.0				
		Repair			1.5			
		Rebuild					2.0	
1006	DC Power Wire Harness	Inspect		0.3				
		Test		0.4				
		Replace		0.8				
		Repair			1.2			
		Rebuild					2.5	

Subcolumns are as follows: C—Operator/Crew O—Organizational F—Direct Support H—General Support D—Depot

(1)	(2)	(3)	(4)					(5)
Group Number	Component/Assembly	Maintenance Function	Maintenance Category					Tools and Equipment
			C	O	F	H	D	
1007	DC Power Wire Harness, Branched	Inspect		0.3				
		Test		0.3				
		Replace		0.8				
		Repair			1.2			
		Rebuild					2.5	
1008	Temperature Sensor Wire Harness	Inspect			0.3			
		Test			0.8			
		Replace			1.0			
		Repair			1.5			
		Rebuild					2.5	
1009	Recirculating Fans Wire Harness, Attaching	Inspect			0.3			
		Test			0.8			
		Replace			1.0			
		Repair			1.5			
		Rebuild					2.5	
1010	Recirculating Fans Wire Harness, Interconnecting	Inspect			0.3			
		Test			0.8			
		Replace			1.0			
		Repair			2.0			
		Rebuild					2.5	
1011	Recirculating Fans Wire Harness, Connecting	Inspect			0.3			
		Test			0.8			
		Replace			1.0			
		Repair			2.0			
		Rebuild					2.5	
1012	Compressor & Exhaust Fans Wire Harness	Inspect			0.3			
		Test			0.8			
		Replace			1.0			
		Repair			2.0			
		Rebuild					2.5	
1013	DC Power Wire Harness, Single Plug	Inspect			0.3			
		Test			0.4			
		Replace			0.5			
		Repair			1.0			
		Rebuild					1.5	
1014	Power Plant Wire Leads	Inspect			0.4			
		Replace			1.0			
1015	Compressor Wire Harness, Attaching	Inspect	0.3					
		Test		0.8				
		Replace		1.0				
		Repair			1.5			
		Rebuild					2.5	
1016	Heat Valves Wire Harness	Inspect	0.3					
		Test		0.8				
		Replace		1.0				
		Repair			2.0			
		Rebuild					2.5	

Subcolumns are as follows: C—Operator/Crew O—Organizational F—Direct Support H—General Support D—Depot

(1)	(2)	(3)	(4)					(5)
Group Number	Component/Assembly	Maintenance Function	Maintenance Category					Tools and Equipment
			C	O	F	H	D	
1017	**Compressor Wire Harness, Interconnecting**	Inspect	0.3					
		Test		0.8				
		Replace		1.0				
		Repair			1.5			
		Rebuild					2.5	
1018	**Compressor Wire Harness, Connecting**	Inspect	0.3					
		Test		0.8				
		Replace		1.0				
		Repair			1.5			
		Rebuild					2.5	
1019	**Air Conditioning Wire Harness**	Inspect		0.3				
		Test		0.8				
		Replace		1.0				
		Repair			1.5			
		Rebuild					2.5	
1020	**Condenser Fans Wire Harness, Lower**	Inspect	0.3					
		Test		0.8				
		Replace		1.0				
		Repair			1.5			
		Rebuild					2.5	
1021	**Condenser Fans Wire Harness, Upper**	Inspect	0.3					
		Test		0.8				
		Replace		1.0				
		Repair			1.5			
		Rebuild					2.5	
1022	**Air Conditioning System Wire Harness**	Inspect	0.3					
		Test		0.8				
		Replace		1.0				
		Repair			1.5			
		Rebuild					2.5	
1023	**Temperature Sensors Wire Harness**	Inspect	0.3					
		Test		0.8				
		Replace		1.0				
		Repair			1.5			
		Rebuild					2.5	
1024	**Anti-ice Thermostats Wire Harness**	Inspect	0.3					
		Test		0.8				
		Replace		1.0				
		Repair			1.5			
		Rebuild					2.5	
1025	**Harness, Water System, Interconnecting**	Inspect	0.3					
		Test		0.8				
		Replace		1.0				
		Repair			2.0			
		Rebuild					2.5	
1026	**Water Pumps Wire Harness, Branched**	Inspect	0.3					
		Test		0.8				
		Replace		1.0				
		Repair			2.0			
		Rebuild					2.5	

Subcolumns are as follows: C—Operator Crew O—Organizational F—Direct Support
H—General Support D—Depot

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Category C	O	F	H	D	(5) Tools and Equipment
1027	Water Pumps Wire Harness, Interconnecting	Inspect	0.3					
		Test		0.8				
		Replace		1.0				
		Repair			2.0			
		Rebuild					2.5	
11	REFRIGERATION SYSTEM AND PLUMBING INSTALLATION							
1101	Lines and Fittings	Inspect	0.3					
		Test			2.0			
		Replace			3.0			
		Repair			4.0			
		Overhaul				8.0		14
1102	Pressure Controls	Inspect		0.5				
		Test			1.0			
		Replace			2.0			
		Repair			2.0			14
		Overhaul					3.0	
		Rebuild					5.0	
1103	Receivers	Inspect	0.3					
		Test			2.0			15, 16,
		Replace			3.0			17, 18
		Repair				2.0		
1105	Coil, Evaporator and Condensor	Inspect	0.1					
		Test			2.0			
		Replace			3.0			
		Repair			2.0			15 thru 18
12	REFRIGERANT COMPRESSOR							
1201	Motor Compressor Assembly	Inspect			0.5			
		Test			2.0			
		Service			3.0			
		Replace			4.0			
		Repair					4.0	
		Overhaul					8.0	9, 14, 19,
		Rebuild					10.0	20, thru 30
13	SOLENOID VALVES, REFRIG.							
1301	Valves, Solenoid	Inspect			0.5			
		Test			1.0			
		Replace			1.0			
		Repair					2.0	14
		Overhaul					3.0	
		Rebuild					4.0	
14	WATER SYSTEM AND PLUMBING INSTALLATION							
1401	Lines and Fittings	Inspect	0.3					
		Replace		2.0				
		Repair			2.0			
1402	Hot Water Tank	Inspect	0.3					
		Replace		2.5				
		Repair			3.0			

Subcolumns are as follows: C—Operator Crew O—Organizational F—Direct Support H—General Support D—Depot

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Category C	O	F	H	D	(5) Tools and Equipment
1408	Surge Tank	Inspect	0.3					
		Replace		2.0				
		Repair			2.0			
15	PUMP ASSEMBLY, COLD WATER							
1501	Pump Assembly	Inspect	0.5					
		Test		0.8				
		Replace		1.0				
		Repair					2.0	
		Overhaul					2.5	
		Rebuild					4.0	
16	PUMP ASSEMBLY, HOT WATER							
1601	Pump Assembly	Inspect	0.5					
		Test		0.8				
		Replace		1.0				
		Repair					2.0	
		Overhaul					2.5	
		Rebuild					4.0	
17	BLEED AIR AND EXHAUST HEATING INSTALLATION							
1701	Bleed Air and Exhaust Heating	Inspect	0.3					
		Replace		2.5				
		Repair		3.0				
		Overhaul					3.5	15 thru 18
		Rebuild					4.5	32, 33
1702	Valve, Bleed Air Shutoff	Inspect		0.5				
		Test		1.0				
		Replace		2.0				
		Repair					2.5	2, 35
		Overhaul					3.0	thru 58
		Rebuild					3.5	
1703	Valves, Hot Air Shutoff	Inspect		0.5				
		Test		1.0				
		Replace		2.0				
		Repair					2.5	
		Overhaul					3.0	
		Rebuild					3.5	
1704	Valve, Solenoid, Normally Closed	Inspect		0.5				
		Test		1.0				
		Replace		2.0				
		Repair					2.5	
		Overhaul					3.0	
		Rebuild					3.5	
18	COMPRESSED AIR AND VACUUM SYSTEM							
1801	Hoses, Lines and Fittings	Inspect	0.5					
		Service		1.0				
		Replace		2.0				
		Repair					4.0	

Subcolumns are as follows: C—Operator/Crew O—Organizational F—Direct Support H—General Support D—Depot

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Category C	O	F	H	D	(5) Tools and Equipment
19	ENGINE AND SKID ASSEMBLY							
1901	Assembly	Inspect		0.5				
		Service		1.5				
		Replace			4.0			
		Repair		10.0				
		Overhaul					25.0	
1902	Pump, Fuel Boost	Inspect	0.3					
		Test		0.5				
		Service		0.5				
		Replace		1.5				
		Repair			2.5			
		Overhaul					3.0	
		Rebuild					3.5	
1903	Tank Assembly, Fuel Float and Vent Valve	Inspect	0.3					
		Test		0.5				
		Replace		1.0				
		Repair			1.0			
1904	Tank, Oil	Inspect	0.3					
		Service	0.1					
		Replace		1.0				
		Repair			1.0			
1905	Tank, Fuel	Inspect	0.3					
		Service	0.6					
		Replace		1.5				
		Repair			2.5			
1906	Chassis Assembly, Upper Electrical Power	Inspect		0.5				
		Test		1.0				
		Replace			3.0			
		Repair		4.0				
1907	Harness, Electrical	Inspect	0.3					
		Test		0.8				
		Replace		2.0				
		Repair			2.5			
		Rebuild					4.0	
1908	Battery Charger Assembly	Inspect	0.3					
		Test		0.5				
		Adjust		0.5				
		Replace		0.8				
		Repair					3.0	
		Overhaul					3.5	
		Rebuild					4.0	
1909	Printed Circuit Board	Inspect					0.3	
		Test					0.5	
		Replace					0.5	
		Repair					1.5	
		Rebuild					2.5	
1910	Voltage Regulator Assy 60 HZ	Inspect	0.3					
		Test		0.5				
		Replace		0.8				
		Overhaul					3.5	

Subcolumns are as follows: C—Operator/Crew O—Organizational F—Direct Support H—General Support D—Depot

(1)	(2)	(3)	(4)					(5)
Group Number	Component/Assembly	Maintenance Function	Maintenance Category					Tools and Equipment
			C	O	F	H	D	
1911	Printed Circuit Board	Inspect					0.3	
		Test					0.5	
		Replace					0.5	
		Repair					1.5	
		Rebuild					2.5	
1912	Voltage Regulator Assy 400 HZ	Inspect	0.3					
		Test		0.5				
		Replace		0.8				
		Overhaul					3.5	
1913	Printed Circuit Board	Inspect						
		Test					0.3	
		Replace					0.5	
		Repair					0.5	
		Rebuild					1.5	
							2.5	
1914	Chassis Assembly, Lower Electrical Power	Inspect		0.5				
		Test		1.0				
		Replace			3.0			
		Repair		1.0				
1915	Harness, Electrical	Inspect	0.3					
		Test		1.0				
		Replace		2.0				
		Repair			2.5			
		Rebuild					4.0	
1916	Wiring Harness, Power, Interconnecting	Inspect	0.3					
		Test		1.0				
		Replace		2.0				
		Repair			2.5			
		Rebuild					3.5	
1917	Wiring Harness, Battery Charger	Inspect	0.3					
		Test		0.5				
		Replace		1.0				
		Repair			1.5			
		Rebuild					3.5	
1918	Generator, 400 HZ	Inspect		0.5				
		Test		1.0				
		Replace			12.0			
		Repair					12.0	
		Overhaul					21.0	
		Rebuild					25.0	
1919	Generator, 60 HZ	Inspect		0.5				
		Test		1.0				
		Replace			12.0			
		Repair					12.0	
		Overhaul					21.0	
		Rebuild					25.0	
1920	Lines and Hoses	Inspect	0.4					
		Replace			2.0			
		Repair			2.5			

Subcolumns are as follows: C—Operator Crew O—Organizational F—Direct Support H—General Support D—Depot

(1)	(2)	(3)	(4)					(5)
Group Number	Component/Assembly	Maintenance Function	Maintenance Category					Tools and Equipment
			C	O	F	H	D	
1921	Cooler and Regulator Assembly, Oil	Inspect	0.4					
		Replace		1.0				
		Repair			1.5			
		Overhaul					3.0	59 thru 73
		Rebuild					4.0	
1922	Engine Assembly	Inspect	0.5					
		Test	2.0					
		Service	2.0					
		Replace		8.0				
		Repair	4.0					
		Overhaul				40.0		
		Rebuild					40.0	75 thru 98
1923	Pipe Assembly, Exhaust	Inspect			0.5			
		Replace			4.5			
		Repair				6.0		99
1924	Plenum, Turbine Exhaust	Inspect		1.0				
		Replace			8.0			
		Repair				16.0		
		Overhaul					20.0	
1925	Torus Assembly	Inspect			1.0			
		Replace				8.0		
		Repair				16.0		
		Overhaul					20.0	
		Rebuild					24.0	
1926	Plenum, Air Inlet, Turbine	Inspect			0.5			
		Replace			8.0			
		Repair				16.0		
		Overhaul					20.0	
1927	Regulator, Air Pressure	Inspect		0.5				
		Service		0.5				
		Adjust		1.0				
		Replace		1.0				
		Repair					3.0	
		Overhaul					3.5	
		Rebuild					4.0	
1928	Wire Harness, Engine	Inspect		0.5				
		Test		0.5				
		Replace		2.0				
		Repair			2.5			
1929	Valve, Load Control	Inspect		0.5				
		Adjust			1.0			
		Replace		2.0				
		Repair					10.0	34 thru 37
		Overhaul					12.0	50, 51, 103
		Rebuild					14.0	thru 110
1930	Fan Assembly, Oil Cooling	Inspect		0.5				
		Replace		1.5				
		Overhaul					2.5	111 thru
		Rebuild					3.5	114

Subcolumns are as follows: C—Operator Crew O—Organizational F—Direct Support H—General Support D—Depot

(1)	(2)	(3)	(4)					(5)
Group Number	Component/Assembly	Maintenance Function	Maintenance Category					Tools and Equipment
			C	O	F	H	D	
1931	Fuel Control Assembly	Inspect		0.5				
		Test		0.5				
		Adjust		1.0				
		Replace		2.0				
		Repair				2.5		75, 76
		Overhaul					4.0	115 thru 122
1932	Pump Assembly, Oil	Inspect		0.5				
		Service		0.5				
		Replace		1.5				
		Overhaul					2.5	
		Rebuild					3.5	
1933	Switch Assembly, Centrifugal	Inspect		0.5				
		Test					2.5	
		Adjust		1.5				
		Replace		1.5				
		Repair					2.0	
		Overhaul					2.5	128
		Rebuild					3.5	
1934	Load Control Thermostat	Inspect		0.3				
		Adjust		1.0				
		Replace		1.0				
		Repair		1.0				
1935	Acceleration Control Thermostat	Inspect		0.3				
		Adjust		1.0				
		Replace		1.0				
		Repair		1.0				
1936	Starter Assembly and Clutch	Inspect		0.5				
		Replace		1.0				
		Repair					2.0	
		Overhaul					4.0	129, 130, 131
1937	Motor, Starting	Inspect					0.5	
		Test					1.0	
		Replace					1.0	
		Repair					1.5	49, 54, 55,
		Overhaul					2.5	132 thru 136
1938	Drive Assembly, Dual Pad	Inspect				0.5		
		Replace				8.0		
		Repair				6.0		77
		Overhaul					12.0	
1939	Housing Assembly, Dual Pad	Inspect				0.5		
		Replace				8.0		
		Repair				6.0		137
		Overhaul					12.0	
1940	Pump Assembly, Oil Scavenge	Inspect				0.5		
		Replace				1.5		
		Repair					1.5	
		Overhaul					2.5	
		Rebuild					3.0	

Subcolumns are as follows: C—Operator Crew O—Organizational F—Direct Support H—General Support D—Depot

(1)	(2)	(3)	(4)					(5)
Group Number	Component/Assembly	Maintenance Function	Maintenance Category					Tools & Equipm
			C	O	F	H	D	
1941	Accessory Drive Gearcase Assembly	Inspect				0.5		
		Replace				12.0		
		Repair				16.0		77, 78,
		Overhaul					20.0	thru 14
1942	Fuel Combustion Chamber	Inspect		0.5				
		Service		0.5				
		Replace		1.5				
		Overhaul					2.0	
		Rebuild					2.5	145 thru
1943	Turbine and Compressor Assy.	Replace				16.0		
		Repair					20.0	
		Overhaul					25.0	111, 150
		Rebuild					30.0	thru 171
1944	Duct Assembly, Inlet Air	Inspect		0.3				
		Replace			1.0			
		Repair			1.5			
1945	Upper Plenum	Inspect		0.3				
		Replace			0.5			
		Repair			1.0			
1946	Lower Plenum	Inspect		0.3				
		Replace			0.5			
		Repair			1.0			
1947	Lower Heat Shield	Inspect		0.3				
		Replace			1.0			
		Repair			1.0			
1948	Upper Heat Shield	Inspect		0.3				
		Replace			1.0			
		Repair			1.0			
1949	Skid Assembly	Inspect			0.5			
		Replace			16.0			
		Repair			6.0			
1950	Skid Sub-Assembly	Inspect			0.5			
		Replace			8.0			
		Repair			3.0			
20	ENCLOSURE ASSEMBLY							
2001	Assembly	Inspect	0.5					
		Replace					5.0	
		Repair			4.0			
		Overhaul					6.0	
		Rebuild					8.0	
2002	Enclosure Sub-Assembly	Inspect	0.5					
		Replace					4.0	
		Repair			3.5			
		Overhaul					5.5	
		Rebuild					7.5	

Subcolumns are as follows: C—Operator/Crew O—Organizational F—Direct Support H—General Support D—Depot

(1)	(2)	(3)	(4)					(5)
Group Number	Component/Assembly	Maintenance Function	Maintenance Category					Tools and Equipment
			C	O	F	H	D	
21	WINTERIZATION KIT							
2101	Kit							
22	SPECIAL TOOLS							
2201	Tools							

Subcolumns are as follows: C—Operator/Crew O—Organizational F—Direct Support H—General Support D—Depot

Section III. Special Tool and Special Test Equipment Requirements

(1) Reference code	(2) Maintenance level	(3) Nomenclature	(4) National stock number (NSN)	(5) Tool number
1	H	Fixture, end play measuring		905128-1-1 (99193)
2	D	Test set, insulation breakdown AC and DC	6625-00-519-2204	259814-1 (99193)
3	D	Test set, electrical—high current AC motor		278039 (99139)
4	D	Test fixture, motor driven fan		905124-1-1 (99193)
5	F	Wrench, torque, holding fix	5120-00-178-0070	905136-1 (70210)
6	D	Arbor set, balancing, fan and wheel		905134-1-1 (99193)
7	H	Fixture, bearing press		905127-1 (99193)
8	D	Cable assembly, special purpose, electrical		901077 (99193)
9	D	Insert set, balancing spt.		278303-2 (99193)
10	F	Wrench, torque holding fix.	5120-00-178-0057	272663 (99193)
11	H	Fixture, bearing press		272166 (99193)
12	D	Arbor, balancing fan and wheel		268145-1&2 (99193)
13	D	Cable assembly, special purpose electrical		905113-1 (99193)
14	F	Service kit, refrigeration	4130-00-400-2150	273898-1-1 (99193)
15	D	Repair kit, leakage, heat exchanger		278197 (99193)
16	H	Plate, end seal	4920-00-015-1657	268129 (99193)
17	H	Plate, end seal		905137-1 (99193)
18	H	Plate, adapter flange		268128 (99193)
19	D	Reamer, hand		253471-1 (99193)
20	D	Reamer, hand		253471-2 (99193)
21	D	Adapter, bushing staking		266352-5 (99193)
22	D	Driver, bushing and slinger		266360-7 (99193)
23	D	Holder, pressing and reaming, bushing and slinger		266362-10 (99193)
24	D	Holder assembly, refrigerant compressor		268039 (99193)
25	D	Arbor, balancing		268152-4&5 (99193)
26	D	Adapter, pressing and reaming holder		272599 (99193)
27	D	Arbor, balancing		278028-7&8 (99193)
28	D	Holder and driver, bearing press		278177 (99193)
29	D	Puller, mechanical, bearing		278179 (99193)
30	D	Test stand, refrigerant comp.		905142-1-1 (99193)
31	D	Gage, butterfly adjusting	5120-00-941-7219	284084-2-1 (99193)
32	F	Plate, end seal		268129-1 (99193)
33	D	Plate, adapter frame		268128-5 (99193)
34	D	Holder, pneumatic valve test	4920-00-547-0521	253030 (99193)
35	D	Test panel, pneumatic control	4920-00-626-3777	281160 (99193)
36	D	Adapter set, valve test	4920-00-473-9237	281312 (99193)
37	D	Puller, mechanical, carbon seal	5120-00-757-1080	281742-1 (99193)
38	D	Adapter, valve test		253072-10 (99193)
39	D	Driver, bearing, needle		253453-10 (99193)
40	D	Puller, mechanical, bearing extending collet		267104 (99193)
41	D	Wrench, socket, internal spline	5120-00-717-1436	280219-4 (99193)
42	D	Driver, retainer		281746-1 (99193)
43	D	Cable, special purpose electrical		281811-5 (99193)
44	D	Gage, bearing end play		284080-2-1 (99193)
45	D	Adapter, torque wrench		284107-1-1 (99193)
46	D	Holder, shim checking		284115-1-1 (99193)
47	D	Cable, special purpose electrical		285534-1 (99193)
48	D	Adapter, valve test		257562-67 (99193)
49	D	Puller, bearing	5120-00-631-8950	253722-1 (99193)
50	D	Dynamometer motor test	6625-00-704-4300	253724 (99193)
51	S	Adjuster, break gap, motor	4920-00-348-9001	253732-0-2 (99193)
52	D	Test set, electrical	4920-00-632-8577	257916-1 (99193)
53	D	Holder, bearing press	4920-00-153-5924	262892 (99193)
54	D	Adjuster, end play, rotor multi-purpose	4920-00-601-1144	266524 (99193)
55	D	Test set, armature	6625-00-556-1601	266674 (99193)
56	D	Test set, actuator load		268100-1 (99193)
57	D	Adapter, actuator torque	4920-00-203-2488	270906-3 (99193)
58	D	Coupling, shaft, rigid	4920-00-038-2895	278130 (70210)
59	D	Stand, test, oil temp. control valve, synthetic	4920-00-547-9009	257990 (99193)
60	D	Holder, test, oil temp. control valve	4920-00-545-2440	253057 (99193)

(1) Reference code	(2) Maintenance level	(3) Nomenclature	(4) National stock number (NSN)	(5) Tool number	
61	D	Cutter, valve, seat, hand	5110-00-591-0411	262730	(99193)
62	D	Puller, tube	5120-00-511-1606	253426	(99193)
63	D	Holder, tool, tube	5120-00-566-2525	253752	(99193)
64	D	Puller, tube	5120-00-376-2831	253754-1	(99193)
65	D	Handle, tool, tube	5120-00-025-2865	253755	(99193)
66	D	Tip, bumping, tube	5120-00-565-3637	253756-8	(99193)
66	D	Tip, bumping, tube	5120-00-536-9616	253756-9	(99193)
66	D	Tip, bumping, tube	5120-00-048-3033	253756-11	(99193)
67	D	Roller, burring, tube	5120-00-212-4080	256066	(99193)
68	D	Expander, tube, roller	5120-00-329-6576	256068	(99193)
69	D	Tip, pulling, tube	5120-00-511-1609	256070	(99193)
70	D	Loosening tool, tube	5120-00-216-7238	256071	(99193)
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72	D	Bit, swaging machine		256121-21	(99193)
73	D	Adapter, leakage test, oil cooler	4920-00-591-0385	258834	(99193)
74	F	Stand, portable, gas turbine engine	4910-00-758-6189	281270-0-3	(99193)
75	O	Analyzer, engine, gas turbine	4920-00-778-6091	281069-1	(99193)
76	O	Cable Assy, special purpose	4940-00-132-4499	284692-1-1	(99193)
77	F	Wrench, spanner	5120-00-793-0701	253562-1	(99193)
78	F	Adapter, wrench	5120-00-608-6794	280377-1	(99193)
79	H	Sling, bar type, adjustable	1730-00-115-3189	281513-3	(99193)
80	F	Mount, gas turbine engine	1730-00-015-8005	281886-1-1	(99193)
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82	F	Adapter, maintenance stand	4920-00-118-0346	284946-1-1	(99193)
83	D	Hose assembly, metal	4920-00-608-8214	258616	(99193)
84	D	Duct, gas turbine bleed air	4920-00-734-1728	281407-2	(99193)
85	D	Mount, vibration pickup	4920-00-736-6299	265846-1	(99193)
86	D	Mount, vibration pickup	4920-00-677-7685	265846-2	(99193)
87	D	Plug, end seal, flange		268014-3	(99193)
88	D	Test system, gas turbine engine		281700	(99193)
89	D	Thermocouple, immersion	6685-00-722-7210	281510-1	(99193)
90	D	Gage, elongation, turbine wheel shaft	5220-00-754-4909	281873-1-1	(99193)
91	D	Holder, turbine wheel shaft	4920-00-015-4303	281872-1-1	(99193)
92	D	Adapter, torque wrench splined	5120-00-738-5913	281875-1-1	(99193)
93	D	Adapter, torque wrench splined	4920-00-015-1768	281877-1-1	(99193)
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97	D	Cable and relay assembly, special purpose		285150-1-1	(99193)
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100	D	Adapter, valve test	4920-00-546-2608	253035	(99193)
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102	D	Wrench, socket, internal spline	5120-00-631-8914	280219	(99193)
103	D	Puller, mechanical, carbon seal	4920-00-804-9012	281484-1	(99193)
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108	D	Restrictor unit, air flow	4920-00-911-1058	282917-29	(99193)
109	D	Holder and gage, solenoid rod trimming	4920-00-841-5418	284241-1-1	(99193)
110	D	Flow restrictor, bellmouth, calibrated		284836-1-1	(99193)
111	D	Balancing machine, dynamic, static, horizontal	6635-00-490-2595	Mdl 1S	(24845)
112	D	Insert, balancing spt., rotating assembly	4920-00-863-7158	256377-9	(99193)
113	D	Mandrel, machined, solid straight	5180-00-066-7832	281753	(99193)
114	D	Adapter, balancing, fan		285092-1-1	(99193)
115	D	Driver, seal, hand	5120-00-330-8548	253648	(99193)
116	D	Puller, mechanical, governor cage assembly	5120-00-506-8278	257954	(99193)

(1) Reference code	(2) Maintenance level	(3) Nomenclature	(4) National stock number (NSN)	(5) Tool number
117	D	Puller, mechanical, seal, fuel pump	5120-00-511-0268	259898 (99193)
118	D	Lapping tool, bushing, hand	5120-00-566-9840	262724 (99193)
119	O	Screw drive and wrench assembly	5120-00-778-6122	280353 (99193)
120	D	Test stand, fuel accessories		281600-4-1 (99193)
121	D	Pilot, shaft installing	4920-00-909-7264	284275-1-1 (99193)
122	D	Cable, special purpose electrical		281811-6 (99193)
123	D	Fixture assembly	4920-00-704-0376	281254 (99193)
124	D	Adapter, switch calibration	4920-00-704-0387	281278 (00103)
125	D	Calibration set, centrifugal switch	4920-00-798-8904	281976-2-1 (99193)
126	D	Test, leakage, centrifugal switch		284386-1-1 (99193)
127	D	Cable, special purpose, electrical		285145-1-1 (99193)
128	D	Calibrator, thermostat		284526-1-1 (99193)
129	F	Holder, clutch torquing	4920-00-336-0648	285541-1-1 (99193)
130	F	Adapter, torque wrench	5120-00-608-4756	280368 (99193)
131	D	Wrench, spanner starter jaw		285090-1-1 (99193)
132	D	Cap, pressure test	4920-00-982-3547	284522-1-1 (99193)
133	D	Dynamometer, motor test		253676-1-1 (99193)
134	D	Panel, test, electrical	6625-00-704-4301	253678-1 (99193)
135	D	Tester, leakage, motor seal		272413-1-1 (99193)
136	D	Holder, bearing press		278399-1-1 (99193)
137	D	Adapter, wrench, external spline		285091-1-1 (99193)
138	F	Puller, mechanical, fan	5120-00-330-8527	253592 (70210)
139	F	Driver, seal	5120-00-525-8557	259560 (99193)
140	F	Driver, seal	5120-00-733-7113	259800-3 (99193)
141	F	Puller, mechanical, seal	5120-00-608-8239	280209 (99193)
142	F	Holder, seal installing	4920-00-614-8483	281029 (99193)
143	D	Holder, bearing pressing		284224-1-1 (99193)
144	D	Cap, pressure test	4920-00-982-3551	284521-1-1 (99193)
145	D	Holder, atomizer, gas turbine	4920-00-334-5147	253680 (99193)
146	D	Adapter, torque wrench	5120-00-330-8551	253682 (99193)
147	D	Tester, fuel nozzle		281450-1 (99193)
148	D	Holder, atomizer distributor	5120-00-788-1009	281464-1 (99193)
150	D	Driver, seal, hand	5120-00-679-2675	253648-3 (99193)
151	D	Adapter, torque wrench	5120-00-738-5011	281714-1 (99193)
152	D	Adapter, hoisting	1730-00-015-8024	281868-1 (99193)
153	D	Driver, seal pressing	5120-00-738-5909	281869-1-1 (99193)
154	D	Driver, bearing and bushing	5120-00-738-5919	281870-1-1 (99193)
155	D	Puller, mechanical, bearing	5120-00-738-5910	281874-1-1 (99193)
156	D	Holder, concentricity checking	4920-00-015-4301	281878-1-1 (99193)
157	D	Puller, mechanical, impeller	5120-00-738-6280	281880-1-1 (99193)
158	D	Puller, mechanical impeller	5120-00-738-6278	281882-1-1 (99193)
159	D	Holder, concentricity checking	4920-00-808-3374	281887-1-1 (99193)
160	D	Arbor, balancing, impeller	6635-00-869-7422	281890-1-1 (99193)
161	D	Arbor, balancing, impeller	6635-00-869-7421	281892-1-1 (99193)
162	D	Puller assembly, bearing and bushing		284045-1-1 (99193)
163	D	Alignment tool support	4920-00-798-1209	284063-1-1 (99193)
164	D	Spacer, impeller		284307-1-1 (99193)
165	D	Dummy bearing		284314-1-1 (99193)
166	D	Fixture, checking, wheel to shroud clearance	4920-00-481-5429	284381-1-1 (99193)
167	D	Alignment tool, bearing, housing and diffuser		284798-1-1 (99193)
168	D	Gage, curvic coupling, concave		285372-1-1 (99193)
169	D	Gage, curvic coupling, convex		285373-1-1 (99193)
170	D	Curvic coupling checking machine	4920-00-814-1546	Mdl No. 19 (25054)
171	D	Cradle, balancing, wheel	4920-00-015-4329	281889-1-1 (99193)
172	F	Sling, multiple leg		284693-1-1 (99193)
173	H	Punch		85-0-3165-11 (51913)
174	H	Clamp		85-0-3166-11 (51913)
175	H	Punch		82-0-3146-1 (51913)
176	H	Die		82-0-3147-11 (51913)
177	O	Plier, wire twister	5120-00-305-2306	WS564 TYPE 1 CLASS 1ASSY B (81348)
178	O	Gun, soldering	3439-00-618-6623	

APPENDIX E
EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. Introduction

E-1. Scope

This appendix lists expendable supplies and materials you will need to operate and maintain the power plant. These items are authorized to you by CTA50-970, Expendable Items (except Medical, Class V, Repair Parts, and Heraldic Items).

E-2. Explanation of Columns

a. Column (1)—Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, Item 5, App. D").

b. Column (2)—Level. This column identifies the lowest level of maintenance that requires the listed item. (enter as applicable:)

C—Operator/Crew
O—Organizational Maintenance
F—Direct Support Maintenance
H—General Support Maintenance

c. Column (3)—National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column (4)—Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parenthesis, if applicable.

e. Column (5)—Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II.
Expendable Supplies and Materials List

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description		(5) U/M
1	C	9130-00-256-8617	Turbine Fuel, JP-4, MIL-J-5624	(1)*	Drum
2	C	9130-00-285-1294	Turbine Fuel, JP-5, MIL-J-5624	(1)*	Drum
3	C	9130-00-967-7002	Fuel, Compression Ignition, Type 1, MIL-F-46005	(1)*	Drum
4	C	9140-00-286-5296	Diesel Fuel, DF-2, Fed. VV-F-800	(1)*	Drum
5	C	9140-00-286-5284	Diesel Fuel, DF-A, Fed. VV-F-800	(1)*	Drum
6	C	9140-00-273-2394	Kerosene, Fed. VV-K-211	(1)*	Drum
7	C	9140-00-274-1912	Diesel Fuel, F-75, MIL-F-16884	(1)*	Drum
8	C	9130-00-221-0680	Gasoline, Automotive, MIL-G-3056	(2)*	Drum
9	C	9130-00-221-0684	Gasoline, Aviation, 80/87, MIL-G-5572	(2)*	Drum
10	C	9130-00-221-0674	Gasoline, Aviation, 91/96, MIL-G-5572	(2)*	Drum
11	C	9130-00-221-0677	Gasoline, Aviation, 100/130, MIL-G-5572	(2)*	Drum
12	C	9130-00-273-2375	Gasoline, Aviation, 115/145, MIL-G-5572	(2)*	Drum
13	O	9150-00-782-2627	Lubricating Oil, Engine, MIL-L-007808		Qt.
14	O	9150-00-985-7099	Lubricating Oil, Engine, MIL-L-23699		Qt.
15	F	9150-00-753-4667	Refrigerant Oil, BMS3-7A-81205		Qt.
16	F	6830-00-782-6232	Refrigerant, Fed. BB-F-1421, Type 114		Cyl.
17	C	4130-00-860-0042	Coater Air Filter		Pt.
18	C		Jet Fuel, JP-8, MIL-T-83133 Level C, (-40°F to 140°F)	(1)*	Drum
19	F	8010-00-111-8010	Paint, Forest Green Enamel 5		Gal.
20	F	8010-00-111-7937	Paint, Forest Green Enamel 1		Gal
21	O	3439-00-453-5469	Solder, Tin Alloy, (81348) SN60WRP2		Roll

*(1) Preferred Fuel, (248 Gal, required for 8 hours operation).
*(2) Emergency Fuels, (50 hours continuous operation maximum).

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*U.S.Government Printing Office;1989-654-030/00262

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FROM: (YOUR UNIT'S COMPLETE ADDRESS)
PFC JOHN DOE
CoA, 3d ENGINEER BN
FT. LEONARD WOOD MO 63108

DATE 16 DEC 74

PUBLICATION NUMBER	DATE	TITLE
TM5-6115-200-20 AND P	1 APR 72	GENERATOR SET 10 KW NSN 6115-00-231-7286

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.
6	2-1 a		
1		4-3	
5	line 20		

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

In line 6 of paragraph 2-1a the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinders

Callout 16 on figure 4-3 is pointing at a bolt. In the key to fig. 4-3, item 16 is called a shim. Please correct one or the other.

I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered so the NSN is wrong. Please give me a good NSN

SAMPLE

NAME, GRADE OR TITLE, AND TELEPHONE NUMBER
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John Doe

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DEPARTMENT OF THE ARMY

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DEPARTMENT OF THE ARMY

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SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 5-6115-590-12	29 March 77	Power Plant, Utility (MUST) Gas

BE EXACT. PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

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MAPS

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END OF VOLUME

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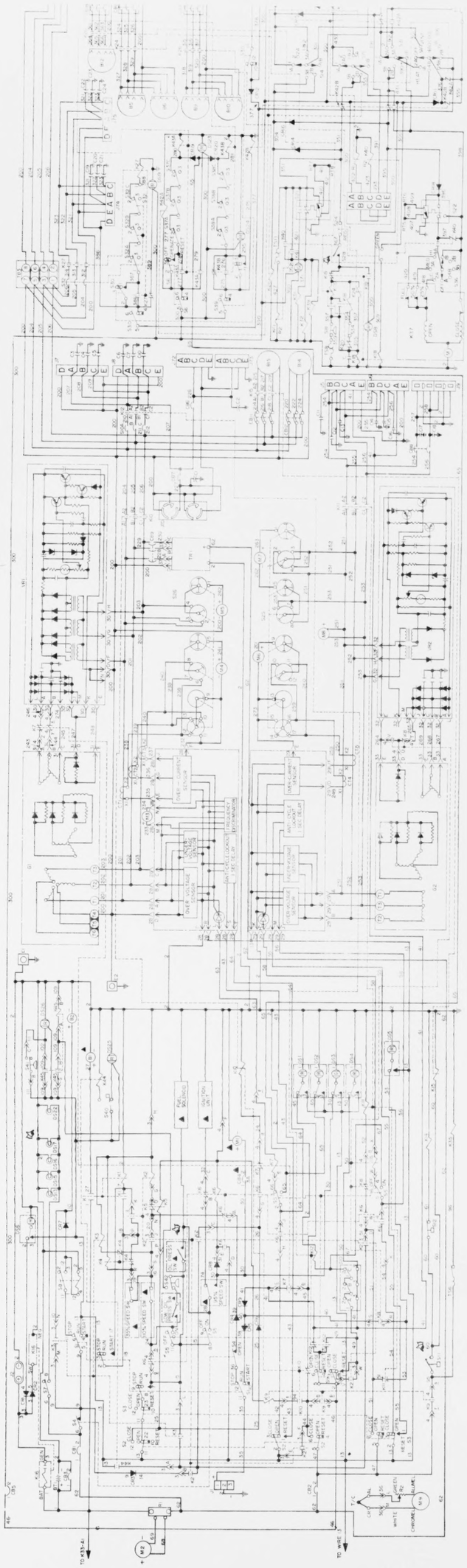

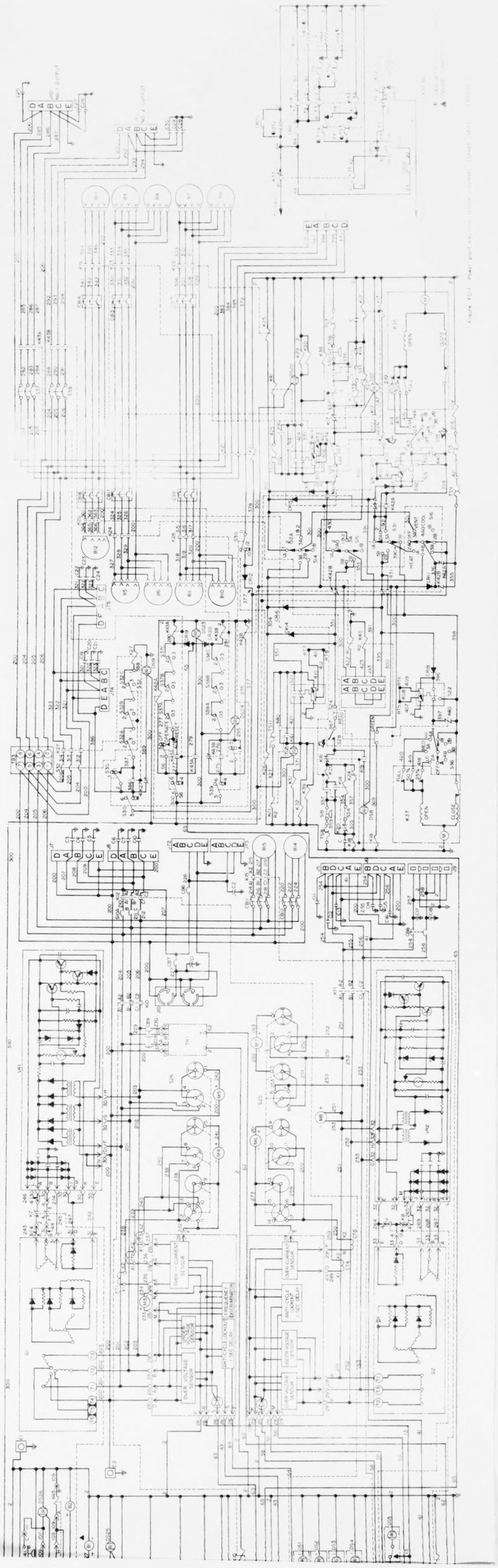

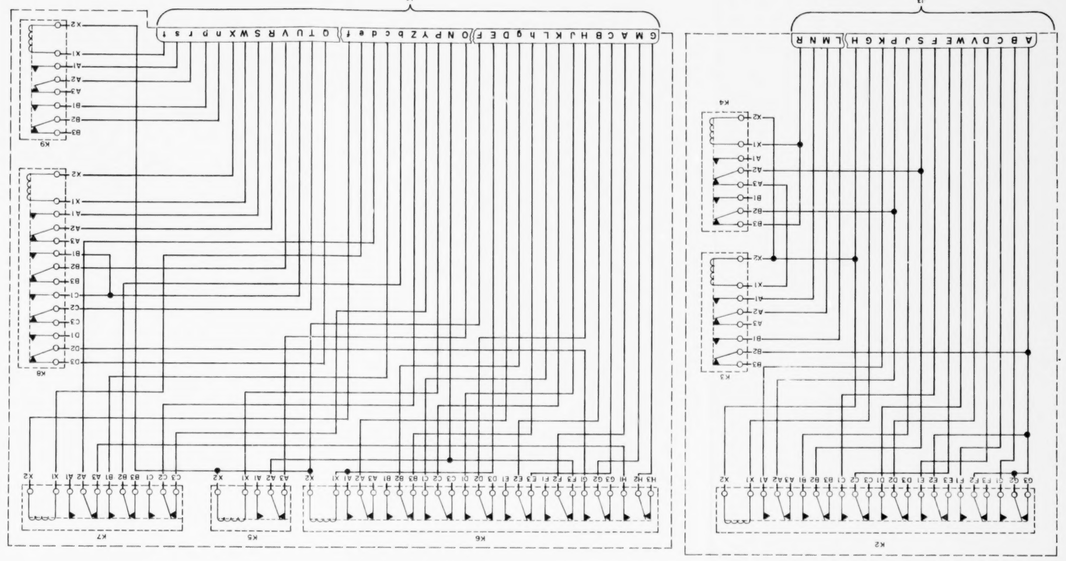

LEGEND FOR FO-1

SYMBOL	NAME
B1	Salt water
B2	Fuel boost pump
B3	No. 1 condenser fan
B4	No. 2 condenser fan
B5	No. 3 condenser fan
B6	No. 4 condenser fan
B7	No. 5 recirculating fan
B8	No. 6 recirculating fan
B9	No. 7 recirculating fan
B10	No. 8 recirculating fan
B11	No. 1 compressor
B12	No. 2 compressor
B13	Cold water pump
B14	Hot water pump
B15	Storage battery
B16	Storage battery
C1	Capacitor
C2	Capacitor
C3	Capacitor
C4	Capacitor
C5	Capacitor
C6	Capacitor
C7	Capacitor
C8	Capacitor
C9	Capacitor
C10	Capacitor
C11	Capacitor
C12	Capacitor
C13	Capacitor
C14	Capacitor
C15	Capacitor
C16	Capacitor
C17	Capacitor
C18	Capacitor
C19	Capacitor
C20	Capacitor
C21	Capacitor
C22	Capacitor
C23	Capacitor
C24	Capacitor
C25	Capacitor
C26	Capacitor
C27	Capacitor
C28	Capacitor
C29	Capacitor
C30	Capacitor
CB1	Circuit breaker (TUBRINE CONTROL)
CB2	Circuit breaker (GENERATOR CONTROL)
CB3	Circuit breaker (BATTERY ACTIVATION)
CB4	Circuit breaker (TIME TOKALIZING METER,
CB5	Circuit breaker (CONDITIONED AIR
	ENGINE)
CB6	Circuit breaker (WATER LINE HEATER)
CB7	Circuit breaker (60 HZ CONVENIENCE)
CB8	Circuit breaker (60 HZ CONVENIENCE)
CB9	Circuit breaker (BATTERY CHARGER)
CB12	Circuit breaker (COLD WATER PUMP)
CB11	Circuit breaker (HOT WATER PUMP)
CB13	Circuit breaker (SYSTEM NO. 1 CONDENSER
	FANS)
CB14	Circuit breaker (SYSTEM NO. 1 COMPRESSOR)
D1	Current transformer (400 HZ B1)
D2	Current transformer (400 HZ B2)
D3	Current transformer (400 HZ B3)
D4	Current transformer (400 HZ B1)
C15	Current transformer (60 HZ B2)
C14	Current transformer (60 HZ B1)
C13	Current transformer (60 HZ B3)
C12	Current transformer (400 HZ B2)
C11	Current transformer (400 HZ B3)
CR1	Diode
CR2	Diode
CR3	Diode
CR4	Diode
CR5	Diode
CR6	Diode
CR7	Diode
CR8	Diode
CR9	Diode
CR10	Diode
CR11	Diode
CR12	Diode
CR13	Diode
CR14	Diode
CR15	Diode
CR16	Diode
CR17	Diode
CR18	Diode
CR19	Diode
CR20	Diode
CR21	Diode
CR22	Diode
CB15	Circuit breaker (SYSTEM NO. 1 RECIRCULATING
	FANS)
CB16	Circuit breaker (SYSTEM NO. 2 RECIRCULATING
	FANS)
CB17	Circuit breaker (SYSTEM NO. 2 COMPRESSOR)
CB18	Circuit breaker (SYSTEM NO. 2 CONDENSER
	FANS)
CB19	Circuit breaker (BATTERY ACTIVATION)
CB20	Circuit breaker (FUEL HEATER)
CB21	Circuit breaker (BATTERY AND FUEL HEATER)
CB22	Circuit breaker (BATTERY AND FUEL HEATER)
D51	Indicator lamp (400 HZ MAIN CONTACTOR TRIP)
D52	Indicator lamp (EMERGENCY OPERATION)
D53	Indicator lamp (400 HZ TRIP)
D54	Indicator lamp (READY TO LOAD)
D55	Indicator lamp (400 HZ OUTPUT CONTACTOR TRIP)
D56	Indicator lamp (REVERSE POLARITY)
D58	Indicator lamp (COMPRESSOR TRIP, SYSTEM 1)
D57	Indicator lamp (COMPRESSOR TRIP, SYSTEM 2)
D512	Indicator lamp (FUEL WARM)
D513	Lamp (PANEL ILLUMINATION)
D514	Lamp (PANEL ILLUMINATION)
D515	Lamp (PANEL ILLUMINATION)
D516	Lamp (PANEL ILLUMINATION)
D517	Indicator lamp (REMOTE OUTPUT TRIP)
D519	Indicator lamp (NO FUEL)
D520	Indicator lamp (CONDITIONED AIR "ON",
	SYSTEM 2)
D521	Indicator lamp (CONDITIONED AIR "ON",
	SYSTEM 1)
D522	Indicator lamp (PANEL)
D523	Indicator lamp (AUXILIARY TRIP, NO. 1 OUTPUT)
D524	Indicator lamp (AUXILIARY TRIP, NO. 2 OUTPUT)
D525	Indicator lamp (BATTERY TRANSFER)
D526	Indicator lamp (AIR BLOCKAGE SYSTEM)

LEGEND FOR FO-1 (CONT)

SYMBOL	NAME
F1	Ground terminal
F2	Ground terminal
F3	Ground terminal
F4	Ground terminal
F5	Ground terminal
F6	Ground terminal

SYMBOL	NAME
C4	Clockwise TURN CONTROL
C42	Clockwise COUNTER CONTROL
C35	Clockwise DISCHARGE A1
C9	Clockwise BATTERY CHARGE
C10	Clockwise COUNTER CHARGE
C17	Clockwise COUNTER SUMP
C22	Clockwise BATTERY FUSE
D1	Hydraulic SPEED MAIN CONTACTOR TEST
D2	Hydraulic SPEED CONTACTOR DRIVER
D3	Hydraulic SPEED CONTACTOR
D4	Hydraulic SPEED CONTACTOR
D7	Hydraulic SPEED CONTACTOR
D8	Hydraulic COMPRESSOR RUN
D12	Hydraulic COMPRESSOR RUN (STOP/GO)
D11	LAMP PHASE ILLUMINATION
D13	LAMP PHASE ILLUMINATION
D14	LAMP PHASE ILLUMINATION
D15	Hydraulic SPEED CONTACTOR TEST
D16	Hydraulic SPEED CONTACTOR TEST
D23	Hydraulic SPEED CONTACTOR TEST 2 OUTPUT
D24	Hydraulic MAIN CONTACTOR
D25	Hydraulic MAIN BLOCKAGE INDICATOR
E1,E2	Heaters
J3	Receptacle
J4	Receptacle
K26	Relay, Electropneumatic SYSTEM LOCK TEST CONTACT
K25	Relay, Electropneumatic SYSTEM LOCK
S10	Switch, BATTERY GAUGE INDICATOR
S11	Switch, HORN
S12	Switch, HORN
S13	Switch, HORN
S14	Switch, HORN
S15	Switch, HORN
S2	Switch, HORN
S3	Switch, KEYED
S4	Switch, KEYED MAIN CONTACTOR
S5	Switch, KEYED MAIN CONTACTOR
S6	Switch, KEYED
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S16	Switch, KEYED
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S822	Switch, KEYED
S823	Switch, KEYED
S824	Switch, KEYED
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S827	Switch, KEYED
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S835	Switch, KEYED
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S837	Switch, KEYED
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S845	Switch, KEYED
S846	Switch, KEYED
S847	Switch, KEYED
S848	Switch, KEYED
S849	Switch, KEYED
S850	Switch, KEYED
S851	Switch, KEYED
S852	Switch, KEYED
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S864	Switch, KEYED
S865	Switch, KEYED
S866	Switch, KEYED
S867	Switch, KEYED
S868	Switch, KEYED
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S870	Switch, KEYED
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S872	Switch, KEYED
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S883	Switch, KEYED
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S925	Switch, KEYED
S926	Switch, KEYED
S927	Switch, KEYED
S928	Switch, KEYED
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S930	Switch, KEYED
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S960	Switch, KEYED
S961	Switch, KEYED
S962	Switch, KEYED
S963	Switch, KEYED
S964	Switch, KEYED
S965	Switch, KEYED
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S997	Switch, KEYED
S998	Switch, KEYED
S999	Switch, KEYED
S1000	Switch, KEYED

Figure 12-2. Instrument panel wiring diagram (Sheet 1)

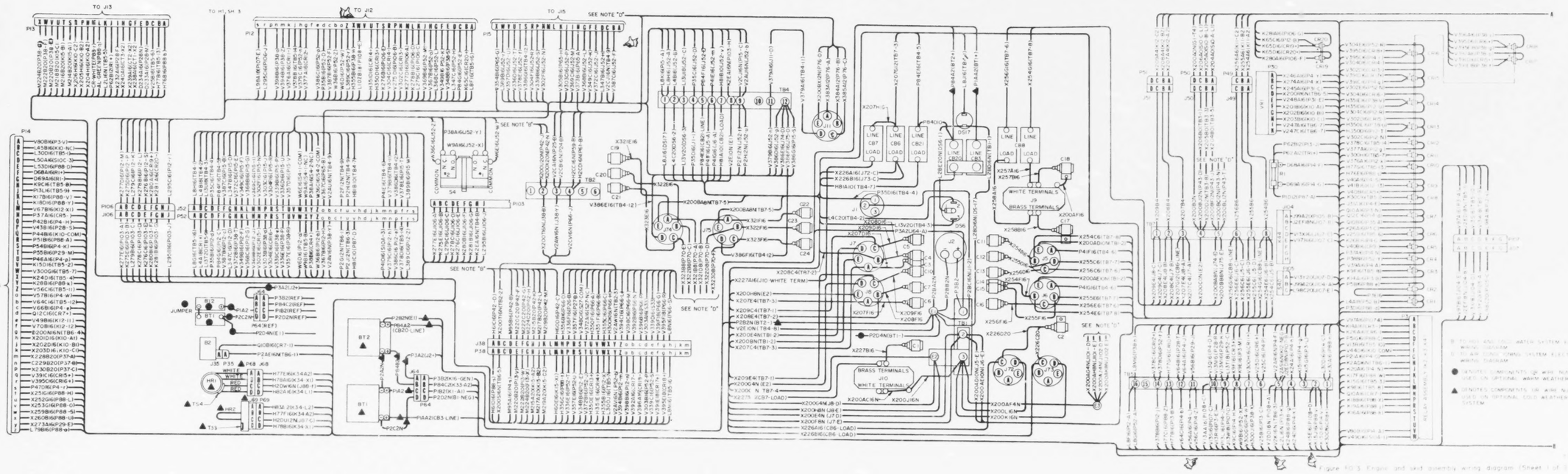

Figure 40-3. Engine and skid assembly wiring diagram (Sheet 1 of 2).

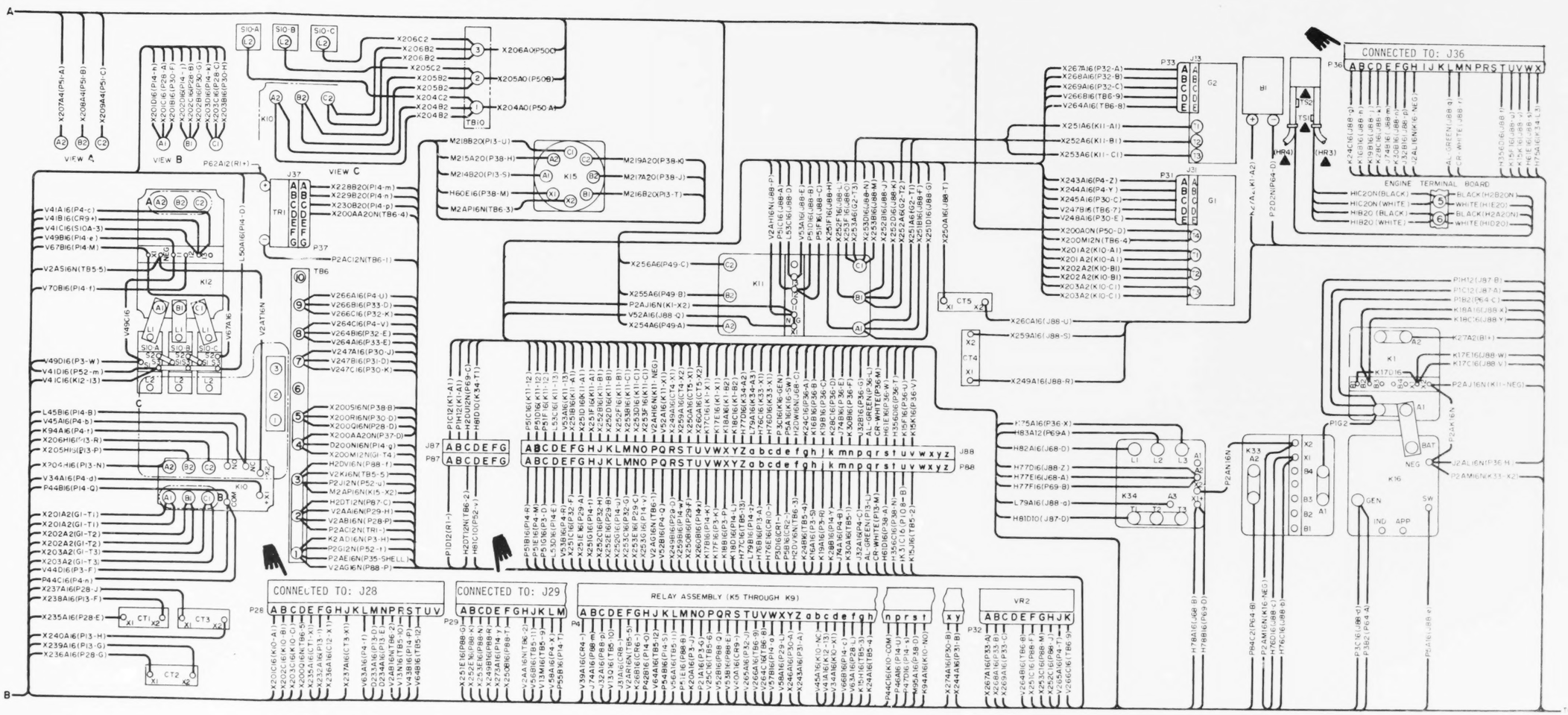

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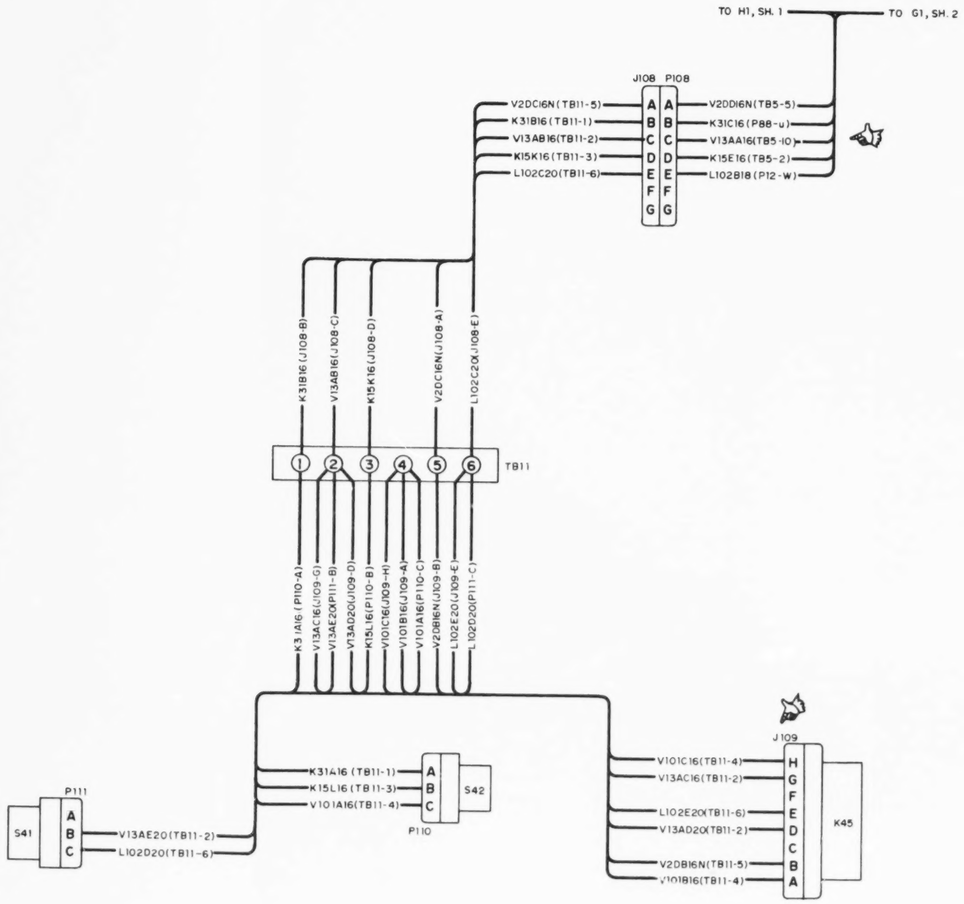
Figure FO-3. Engine and skid assembly wiring diagram (Sheet 2 of 3) CH



LEGEND FOR FO-3

SYMBOL	NAME
B1	Start motor
B2	Fuel boost pump
BT1	Storage battery
BT2	Storage battery
C1	Capacitor
C2	Capacitor
C3	Capacitor
C4	Capacitor
C5	Capacitor
C6	Capacitor
C7	Capacitor
C10	Capacitor
C11	Capacitor
C12	Capacitor
C13	Capacitor
C14	Capacitor
C15	Capacitor
C16	Capacitor
C17	Capacitor
C18	Capacitor
C19	Capacitor
C20	Capacitor
C21	Capacitor
C22	Capacitor
C23	Capacitor
C24	Capacitor
CB3	Circuit breaker (BATTERY ACTIVATION)
CB6	Circuit breaker (WATER LINE HEATERS)
CB7	Circuit breaker (400 HZ CONVENIENCE)
CB8	Circuit breaker (60 HZ CONVENIENCE)
CB20	Circuit breaker (BATTERY ACTIVATION)
CB21	Circuit breaker (FUEL HEATER)
CR1	Diode
CR2	Diode
CR3	Diode
CR4	Diode
CR5	Diode
CR6	Diode
CR7	Diode
CR8	Diode
CR9	Diode
CR10	Diode
CR11	Diode
CR12	Diode
CR13	Diode
CR14	Diode
CR15	Diode
CR16	Diode
CR17	Diode
CR18	Diode
CR19	Diode
CR20	Diode
CR21	Diode
CR22	Diode
CT1	Current transformer (400 HZ Ø1)
CT2	Current transformer (400 HZ Ø2)
CT3	Current transformer (400 HZ Ø3)
CT4	Current transformer (60 HZ Ø1)
CT5	Current transformer (60 HZ Ø2)
DS6	Indicator lamp (REVERSE POLARITY)
DS17	Lamp (PANEL ILLUMINATION)
E1	Ground terminal
E2	Ground terminal
E3	Ground terminal
G1	Generator (120 KVA, 3 PHASE, 400HZ)
G2	Generator (12.5 KVA, 1 PHASE, 60HZ)
*HR1	Fuel filter heater
*HR2	Fuel tank heater
HR3	Engine fuel line heater
*HR4	Power plant fuel line heater
J1	Receptacle (STANDBY)
J2	Receptacle (DC SLAVE)
J5	Receptacle (60 HZ AC POWER OUTPUT)
J6	Receptacle (60 HZ AC POWER OUTPUT)
J7	Receptacle (400 HZ AC POWER OUTPUT)
J8	Receptacle (400 HZ AC POWER OUTPUT)
J9	Receptacle (60 HZ CONVENIENCE)
J10	Receptacle (400 HZ CONVENIENCE)
J11	Receptacle (REMOTE POWER INPUT)
J35	Receptacle
J38	Receptacle
J49	Receptacle
J50	Receptacle
J51	Receptacle
J52	Receptacle
J64	Receptacle
J68	Receptacle
*J69	Receptacle
J72	Receptacle (WATER LINE HEATING)
J73	Receptacle (WATER LINE HEATING)
J74	Receptacle (REMOTE POWER OUTPUT)
J75	Receptacle (REMOTE POWER OUTPUT)
J87	Receptacle
J88	Receptacle
J108	Receptacle
J 109	Receptacle
K1	Relay (START)
K10	Contactor (400 HZ MAIN)
K11	Contactor (60 HZ OUTPUT)
K12	Contactor (400 HZ OUTPUT)
K15	Contactor (HOT WATER PUMP)
K16	Relay (REVERSE CURRENT)
K33	Contactor (BATTERY TRANSFER)
K34	Relay (FUEL HEATER)
K44	Relay (NO FUEL SHUTDOWN)
K45	Relay (AIR BLOCKAGE SYSTEM)
P3	Plug
P4	Plug
P12	Plug
P13	Plug
P14	Plug
P15	Plug
P28	Plug
P29	Plug
P30	Plug
P31	Plug
P32	Plug
P33	Plug

LEGEND FOR FO-3 (CONT)

SYMBOL	NAME
P35	Plug
P36	Plug
P37	Plug
P38	Plug
P49	Plug
P50	Plug
P51	Plug
P52	Plug
P64	Plug
*P68	Plug
P69	Plug
P87	Plug
P88	Plug
P103	Plug
P105	Plug
P106	Plug
P107	Plug
P108	Plug
P110	Plug
P111	Plug
S4	Switch (AIR INTAKE DOOR)
S10A	Switch (400 HZ OUTPUT OVERLOAD SE CONTROL)
S10B	Switch (400 HZ OUTPUT OVERLOAD SE CONTROL)
S10C	Switch (400 HZ OUTPUT OVERLOAD SE CONTROL)
S40	Switch (FUEL FLOAT TANK)
S41	Switch (AIR BLOCKAGE INDICATOR)
S42	Switch (AIR BLOCKAGE SHUTDOWN)
TB1	Terminal board
TB2	Terminal board
TB4	Terminal board
TB5	Terminal board
TB6	Terminal board
TB7	Terminal board
TB10	Terminal board
TB11	Terminal board
TR1	Battery charger
*TS1	Thermostat (ENGINE FUEL LINE HEATER
*TS2	Thermostat (POWER PLANT FUEL LINE H
*TS3	Thermostat (FUEL TANK HEATER)
*TS4	Thermostat (FUEL FILTER HEATER)
VR1	Voltage regulator (400 HZ)
VR2	Voltage regulator (60 HZ) 400 HZ protective panel 60 HZ protective panel

* Denotes components used on cold weather units only.

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Change 6

Figure FO-3. Engine and skid assembly wiring diagram (Sheet 3 of 3)

TO H1, SH. 3
FO-3 (2)
ange 7

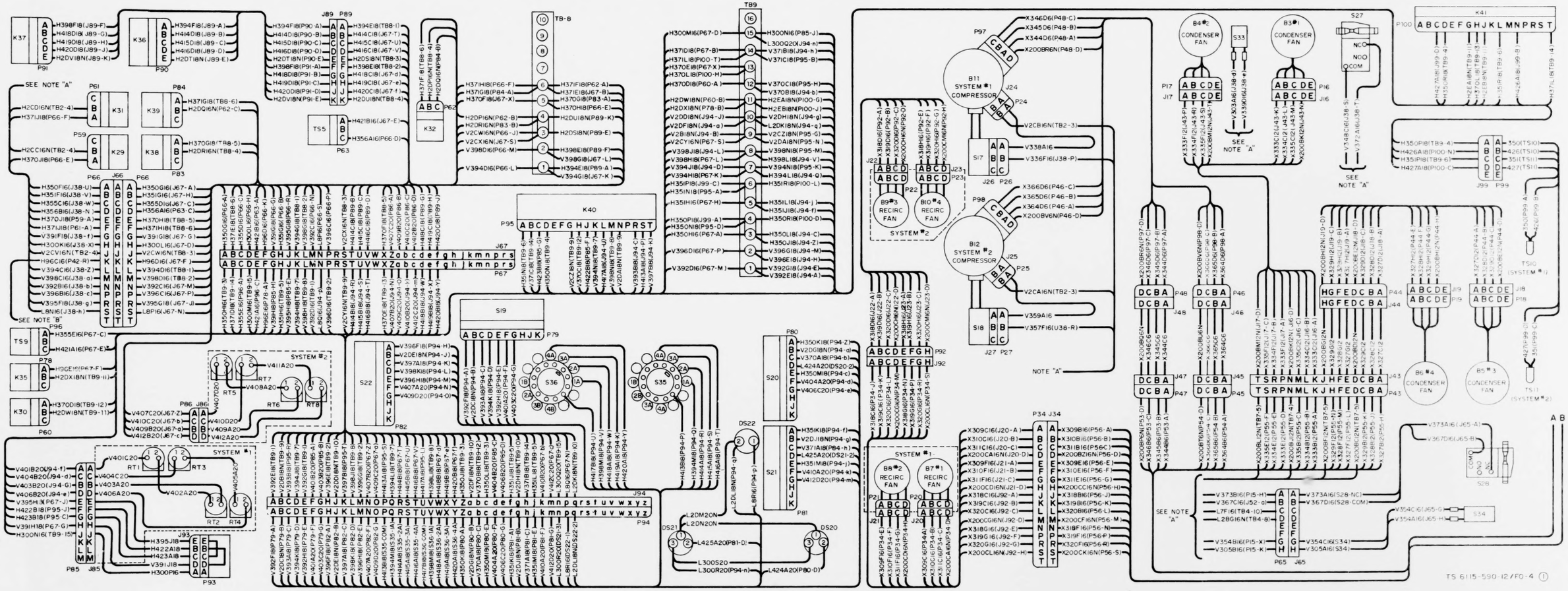

Figure FO-4. Conditioned air system wiring diagram (Sheet 1 of 2)

SEE NOTE "A"
VIEW C
NOTES
"A" TO GAS TURBINE ENGINE AND POWER PLANT ELECTRICAL WIRING DIAGRAM
"B" TO WATER SYSTEM ELECTRICAL WIRING DIAGRAM

LEGEND FOR 1 OF 4

SYMBOL	NAME	SYMBOL	NAME
B3	No. 1 condenser fan	J91	Receptacle
B4	No. 2 condenser fan	J92	Receptacle
B5	No. 3 condenser fan	J93	Receptacle (REMOTE TEMPERATURE SENSING)
B6	No. 4 condenser fan	J94	Receptacle
B7	No. 1 recirculating fan	J102	Receptacle (AUXILIARY POWER, NO. 1 OUTPUT)
B8	No. 2 recirculating fan	J103	Receptacle (AUXILIARY POWER, NO. 2 OUTPUT)
B9	No. 3 recirculating fan	J104	Receptacle
B10	No. 4 recirculating fan	J105	Receptacle
B11	No. 1 compressor	K17	Relay (COMPRESSOR HEAT AND TRIP RESET, SYSTEM 1)
B12	No. 2 compressor	K18	Relay (COMPRESSOR HEAT AND TRIP RESET, SYSTEM 2)
C25	Capacitor	K19	Contactor (COMPRESSOR, SYSTEM 1)
C26	Capacitor	K20	Contactor (COMPRESSOR, SYSTEM 2)
C27	Capacitor	K21	Contactor (REMOTE INPUT)
C28	Capacitor	K23	Contactor (CONDENSER FAN, SYSTEM 1)
C29	Capacitor	K24	Contactor (CONDENSER FAN, SYSTEM 2)
C30	Capacitor	K25	Contactor (RECIRCULATING FAN, SYSTEM 1)
CB13	Circuit breaker (SYSTEM 1 CONDENSER FANS)	K26	Contactor (RECIRCULATING FAN, SYSTEM 2)
CB14	Circuit breaker (SYSTEM 1 COMPRESSOR)	K27	Contactor (REMOTE OUTPUT)
CB15	Circuit breaker (SYSTEM 1 RECIRCULATING FANS)	K29	Valve (COMPRESSOR BY-PASS, SYSTEM 1)
CB16	Circuit breaker (SYSTEM 2 RECIRCULATING FANS)	K30	Valve (REFRIGERATION, SYSTEM 1)
CB17	Circuit breaker (SYSTEM 2 CONDENSER FANS)	K31	Valve (COMPRESSOR BY-PASS, SYSTEM 2)
CB18	Circuit breaker (SYSTEM 2 COMPRESSOR)	K32	Valve (REFRIGERATION, SYSTEM 2)
D520	Indicator lamp (CONDITIONED AIR ON, SYSTEM 1)	K35	Valve (WATER COMPARTMENT HEAT)
D521	Indicator lamp (CONDITIONED AIR ON, SYSTEM 2)	K36	Valve (HEAT SYSTEM FLOW CONTROL, SYSTEM 1)
D522	Lamp (PANEL ILLUMINATION)	K37	Valve (HEAT SYSTEM FLOW CONTROL, SYSTEM 2)
J15	Receptacle	K38	Valve (REFRIGERATION DE-ICING, SYSTEM 1)
J16	Receptacle	K39	Valve (REFRIGERATION DE-ICING, SYSTEM 2)
J17	Receptacle	K40	Relay (REMOTE TEMPERATURE SENSING, SYSTEM 1 AND 2)
J18	Receptacle	K41	Relay (EVAPORATOR ANTI-ICE, SYSTEM 1 AND 2)
J19	Receptacle	K43A	Contactor (AUXILIARY POWER, OUTPUT 1)
J20	Receptacle	K43B	Contactor (AUXILIARY POWER, OUTPUT 2)
J21	Receptacle	K44	Relay (NO FUEL SHUTDOWN)
J22	Receptacle	P16	Plug
J23	Receptacle	P17	Plug
J24	Receptacle	P18	Plug
J25	Receptacle	P19	Plug
J26	Receptacle	P20	Plug
J27	Receptacle	P21	Plug
J34	Receptacle	P22	Plug
J43	Receptacle	P23	Plug
J44	Receptacle	P24	Plug
J45	Receptacle	P25	Plug
J46	Receptacle	P26	Plug
J47	Receptacle	P27	Plug
J48	Receptacle	P34	Plug
J53	Receptacle	P43	Plug
J54	Receptacle	P44	Plug
J55	Receptacle	P45	Plug
J56	Receptacle	P46	Plug
J65	Receptacle	P47	Plug
J66	Receptacle	P48	Plug
J67	Receptacle	P53	Plug
J70	Receptacle	P54	Plug
J76	Receptacle	P55	Plug
J85	Receptacle	P56	Plug
J86	Receptacle	P57	Plug
		P58	Plug

Figure FO-4 Conditioned air system wiring diagram (Sheet 2 of 2) (Cont'd)